

# **CMS Magnet Testte Alınan CASTOR Local Datalarının (LED ve Pedestal) Analizi**

**Global datanın DQM Offline analizi**

**SEMİRAY GİRGİS**

# İÇERİK

- **CASTOR neden tasarlandı?**
- **CASTORDA neler araştırılacak?**
- **CASTORUN mekanik tasarımı nasıl?**
- **CASTOR dataları nasıl alındı?**
- **LOCAL data analizlerinde neler yapıldı?**
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  - **Farklı manyetik alanda aynı voltajdaki datanın analizi.**
  - **Pedestal analizi**
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# CASTOR NEDEN TASARLANDI ?

- **CASTOR bir etkileşmenin hadronik ve fotonik bileşenlerini (foton ve yüklü parçacık çokluları, elektromanyetik ve hadronik enerjileri) ölçmek ve çok ileri faz uzayındaki nesnelere tanımlamak üzere tasarlanmıştır.**

# CASTORDA NELER ARAŞTIRILACAK ?

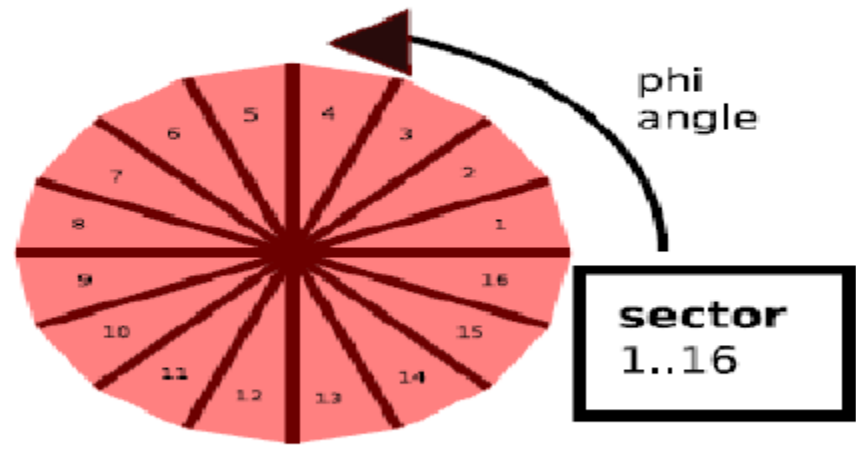
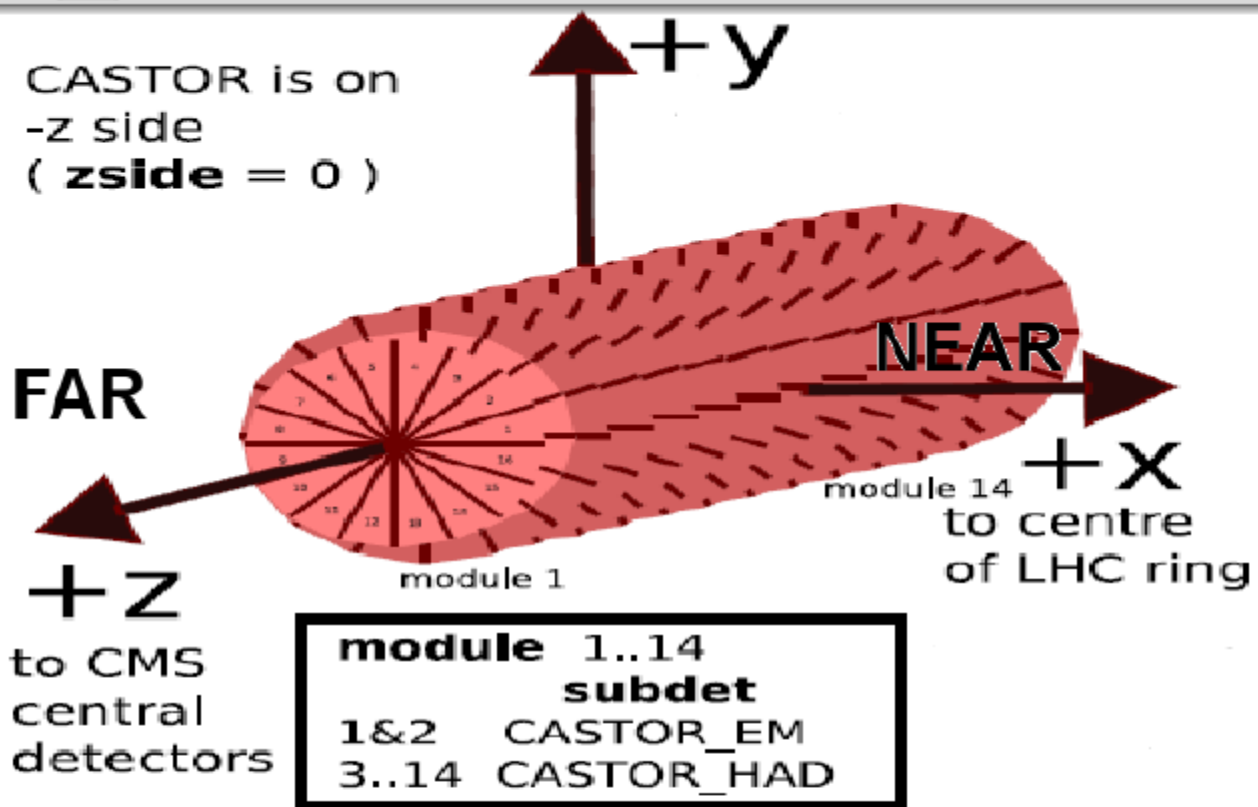
- Normal hadronik etkileşmelerle düşük enerjili yüklü parçacık çoklularını karşılaştırmak,
- Detektörde çok büyük miktarda bırakılan enerjideki düzensizliğe bakmak,
- Normal hadronların etkileşme menziline çok daha ötesinde yüksek giriciliği olan nesnelere araştırmak.
- CMS dik enerji bakımından zengin olacaktır ve dik enerjinin %6'sının CASTOR'da kalması beklenmektedir. Bu enerjinin doğru tahmin edilmesi kayıp dik momentumun da doğru

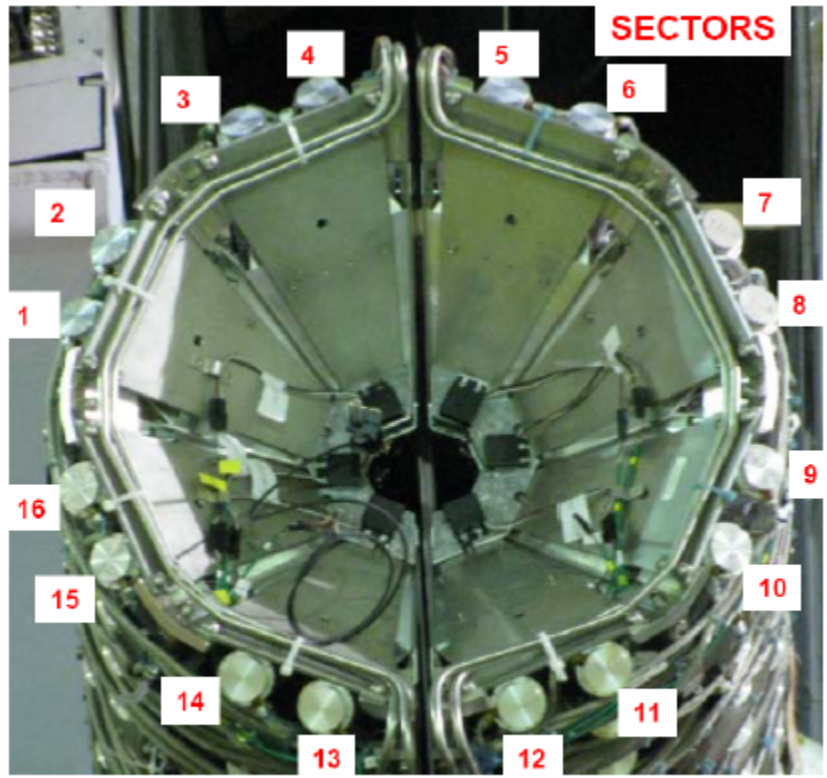
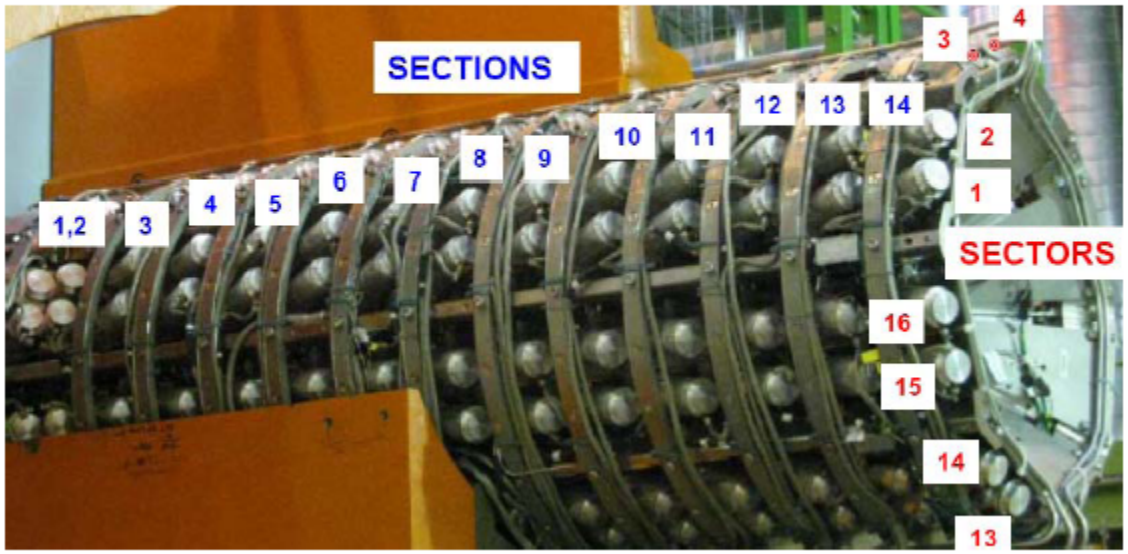
# CASTORUN MEKANİK TASARIMI

- **CASTOR Elektromanyetik (EM) ve Hadronik (HAD) kısımdan oluşan ve Çerenkov ışınımı esasına göre çalışan bir Tungsten (W)– Kuvartz (Q) örnekleme kalorimetresidir.**
- **CMS'nin etkileşme noktasından 14,38 m uzaklıktadır.**
- **CMS detektörünün ileri bölgesinde ve EM için  $5,3 < \eta < 6,46$  ve hadronik**

# MEKANİK TASARIM

- Kalorimetre 8 oktanttan (dairenin  $1/8$ 'i) oluşmaktadır. Her oktant iki yarım oktanttan meydana gelmiştir. Bir oktantta 28 kanal (Okuma Birimi-OB) bulunmaktadır. Bu kanallardan 4 tanesi EM, 24 tanesi de HAD kanallardan gelen sinyalleri okuyacaktır.
- CASTOR'da 32 tanesi EM ve 192 tanesi HAD kanal'a ait olmak üzere toplam 224 kanal bulunacaktır. CASTOR 14







# **CASTOR DCS ve LOCAL DATA ALIMI**

## Castor DCS software.

```
ssh -X2 semiray@cmsusr1 sonra rdesktop -g 1024x800 CMS-  
CAS-DCS-02.
```

Castor main panel



# Castor HV panel

CMS\_CASTOR: TOP (System1 - CastorDCS; #1)

System: CMS\_CASTOR    State: ERROR

Sub-System: High voltage (ERROR), Low voltage (OFF)

Castor\_HV: TOP (System1 - CastorDCS; #1)

System: High voltage    State: ERROR

Sub-System: Near side (ERROR), Far side (WARNING)

Messages

Close

# Castor side level

Castor\_HV: TOP (System1 - CastorDCS; #1)

**System** High voltage **State** ERROR

**Sub-System** **State**

Near side ERROR

Far side WARNING

Messages

Castor\_HV\_Near: TOP (System1 - CastorDCS; #1)

**System** Near side **State** ERROR

**Sub-System** **State**

Module	State
Module1	ERROR
Module2	ERROR
Module3	ERROR
Module4	ERROR
Module5	ERROR
Module6	ERROR
Module7	ERROR
Module8	ERROR
Module9	WARNING
Module10	OFF
Module11	OFF
Module12	OFF
Module13	OFF
Module14	OFF

#	Side	Module	Sector	Group	Type	Enb	On/Off	Status	Vset	Vmon	Iset	Imon
64	Near	Module10	13-14-15-16	2	CV	✓	Off		10	0	9	0
65	Near	Module10	13-14-15-16	2	DV	✓	Off		10	0	9	0
66												
67	Near	Module11	1-2-3-4	1	CV	✓	Off		10	0	9	0
68	Near	Module11	1-2-3-4	1	DV	✓	Off		10	0	9	0
69	Near	Module11	13-14-15-16	2	CV	✓	Off		10	0	9	0
70	Near	Module11	13-14-15-16	2	DV	✓	Off		10	0	9	0
71												
72	Near	Module12	1-2-3-4	1	CV	✓	Off		10	0	9	0
73	Near	Module12	1-2-3-4	1	DV	✓	Off		10	0	9	0
74	Near	Module12	13-14-15-16	2	CV	✓	Off		10	0	9	0
75	Near	Module12	13-14-15-16	2	DV	✓	Off		10	0	9	0
76												
77	Near	Module13	1-2-3-4	1	CV	✓	Off		10	0	9	0
78	Near	Module13	1-2-3-4	1	DV	✓	Off		10	0	9	0
79	Near	Module13	13-14-15-16	2	CV	✓	Off		10	0	9	0
80	Near	Module13	13-14-15-16	2	DV	✓	Off		10	0	9	0
81												
82	Near	Module14	1-2-3-4	1	CV	✓	Off		10	0	9	0
83	Near	Module14	1-2-3-4	1	DV	✓	Off		10	0	9	0
84	Near	Module14	13-14-15-16	2	CV	✓	Off		10	0	9	0
85	Near	Module14	13-14-15-16	2	DV	✓	Off		10	0	9	0
86												

Apply recipe Create recipe HV board temperature

Messages

Close

# LOCAL DATA ANALİZİ

**(Farklı voltajda aynı manyetik alandaki datanın  
Analizi**

**1000V vs 1200V@0T**

**1000V vs 1100V@3.75T**

**Ekaterina setting vs 1200V@3.75T**

**Pedestal( with Ekaterina setting )@0 T**

**Pedestal( with Ekaterina setting )@3.75 T**

# RUN DETAYLARI

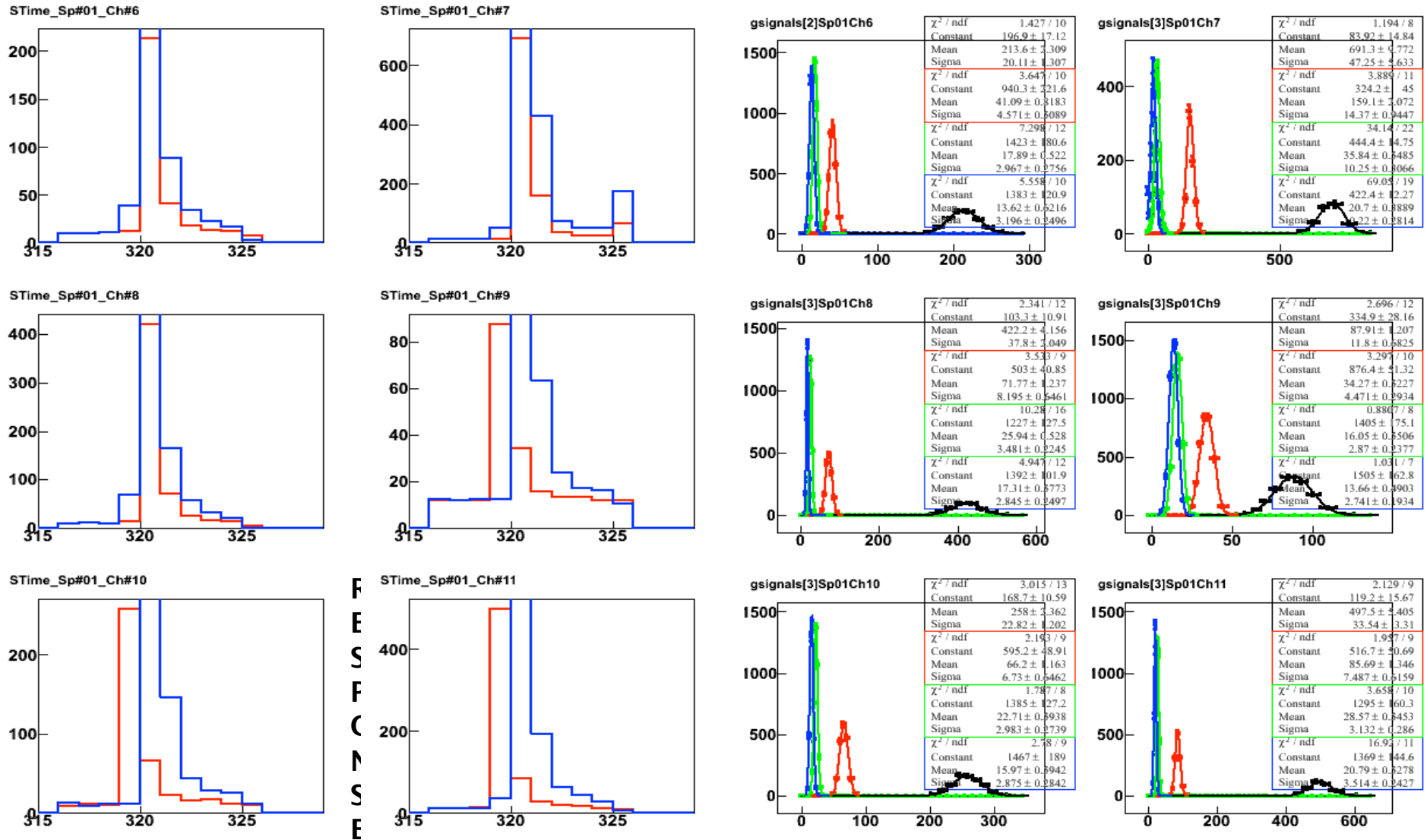
Run number	Events	HV status(V)	Led status	Magnet (T)
122419	10K	1000/60	ON	0
122396	10K	1200/70	ON	0
123526	10K	1000/60	ON	3.75
123512	10K	1100/65	ON	3.75
123514	10K	1200/70	ON	3.75
123522	10K	Ekaterina setting	ON	3.75
123521	10K	Ekaterina setting	OFF	3.75
122851	1K	Ekaterina setting	OFF	0

Bu çalışmada yeni mapping kullanıldı.

(**emap\_3dcc\_noncmssw\_Fri\_Nov\_20\_2009.txt**) ve kasımın sonu aralığının başında alınan datalar analiz edildi.

**1000V vs 1200V@0T spigot  
1**

# 1000V vs 1200V@0T-spigot1

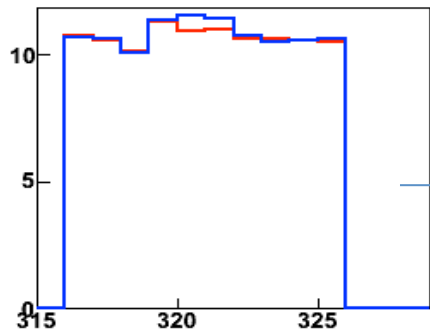


TS

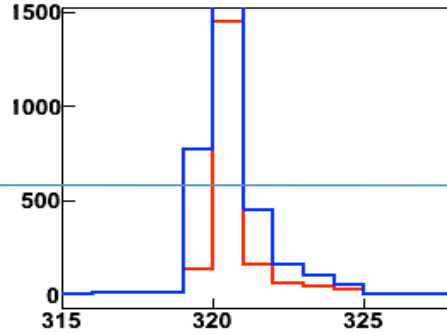


# 1000V vs 1200V@0T-spigot1

STime\_Sp#01\_Ch#12

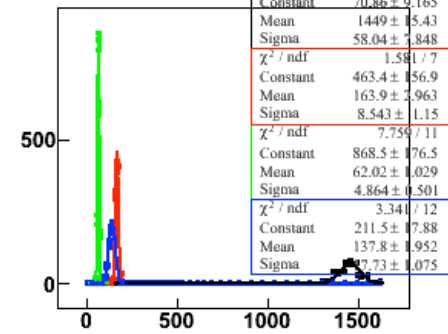


STime\_Sp#01\_Ch#13

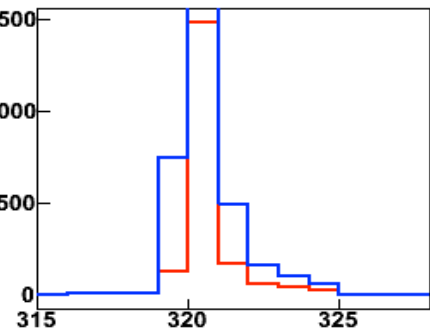


No signal

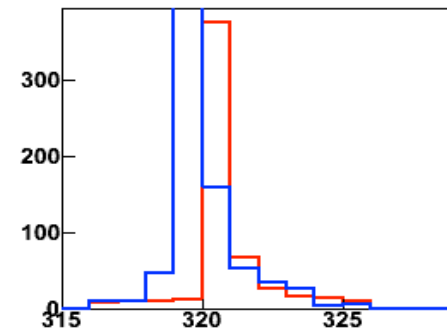
gsignals[2]Sp01Ch13



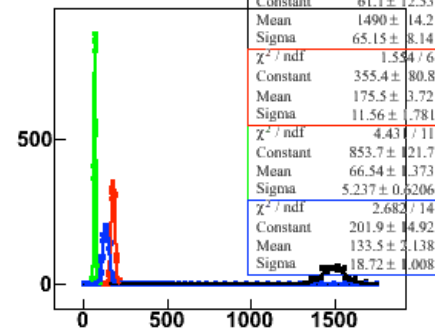
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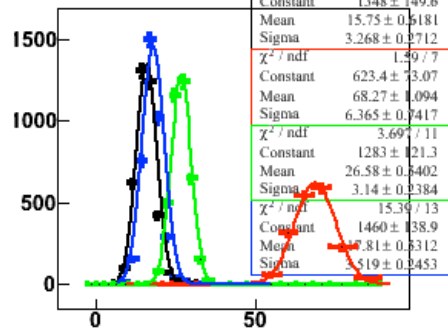
STime\_Sp#01\_Ch#15



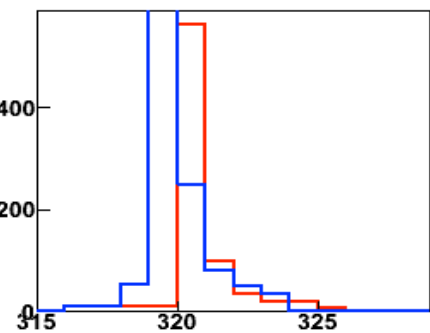
gsignals[2]Sp01Ch14



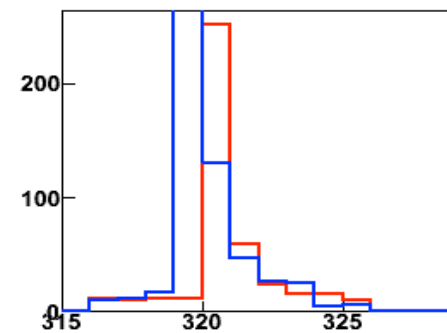
gsignals[3]Sp01Ch15



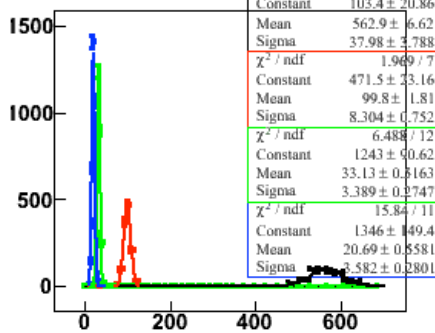
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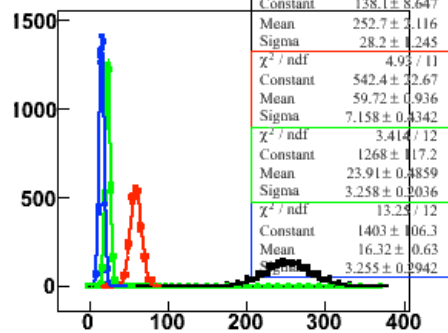
STime\_Sp#01\_Ch#17



gsignals[3]Sp01Ch16

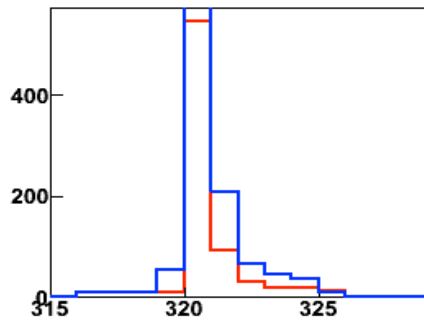


gsignals[3]Sp01Ch17

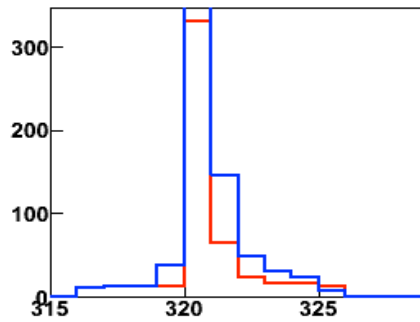


# 1000V vs 1200V@0T-spigot1

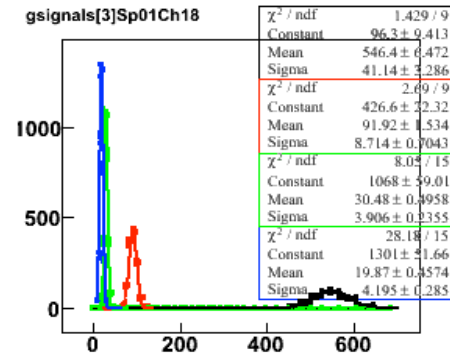
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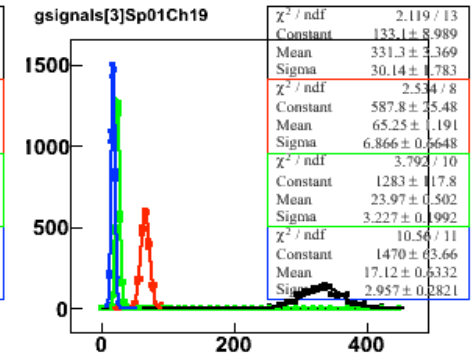
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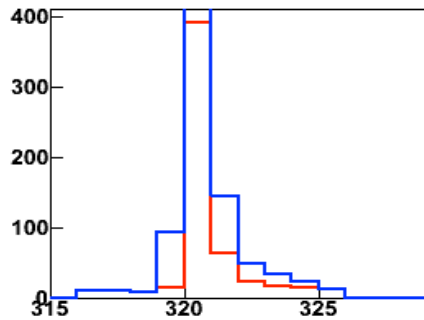
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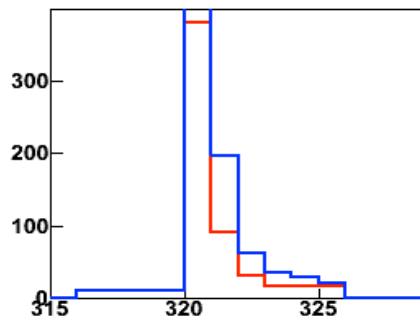
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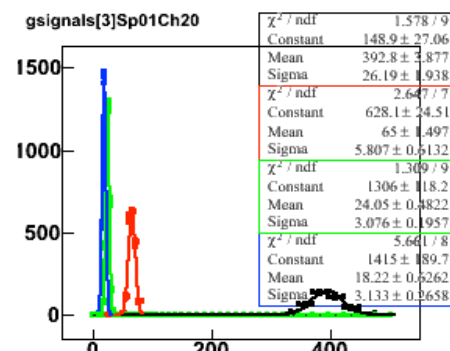
STime\_Sp#01\_Ch#20



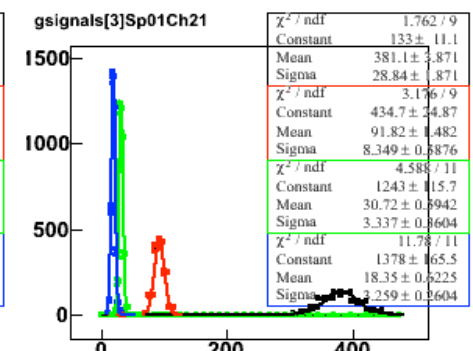
STime\_Sp#01\_Ch#21



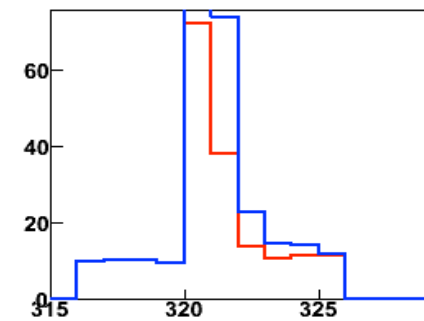
gsignals[3]Sp01Ch20



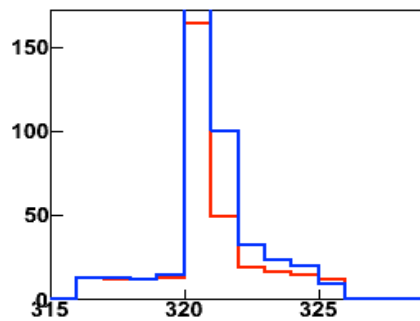
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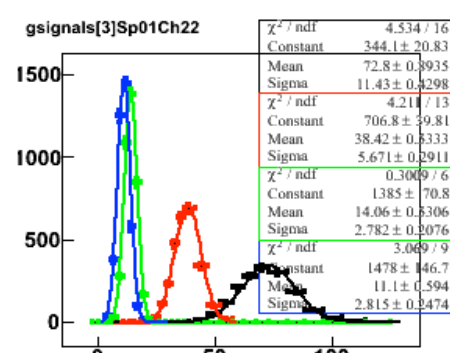
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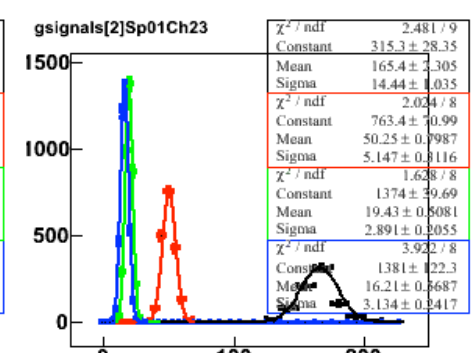
STime\_Sp#01\_Ch#23



gsignals[3]Sp01Ch22

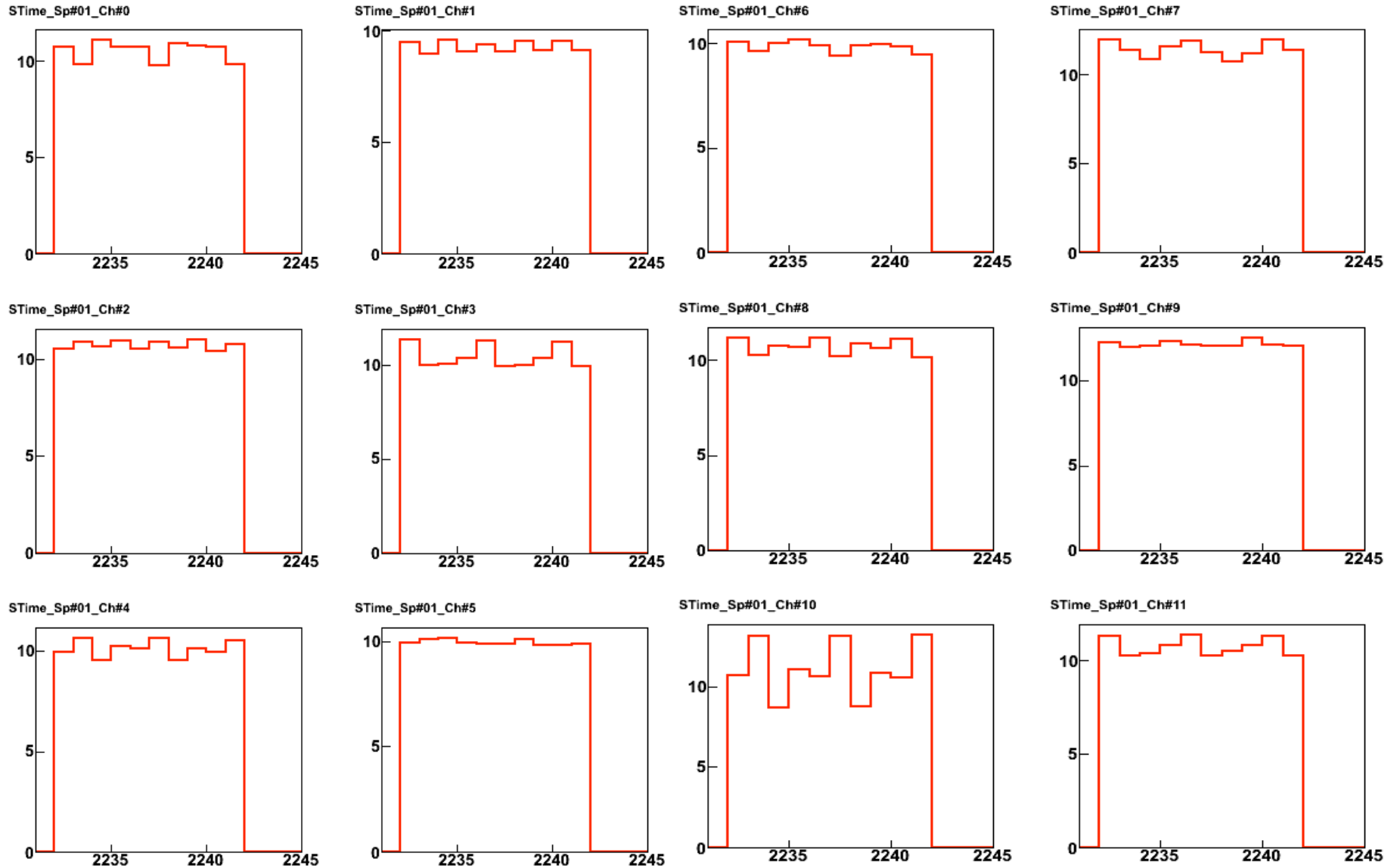


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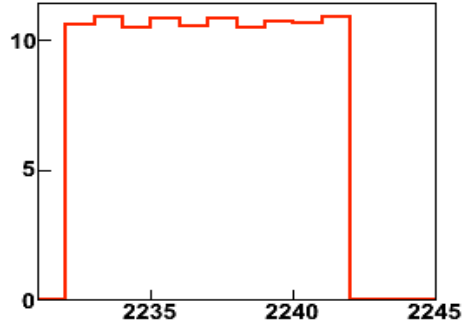
**Pedestal run with  
Ekaterina setting@OT-**

# Pedestal run with Ekaterina setting@0T-

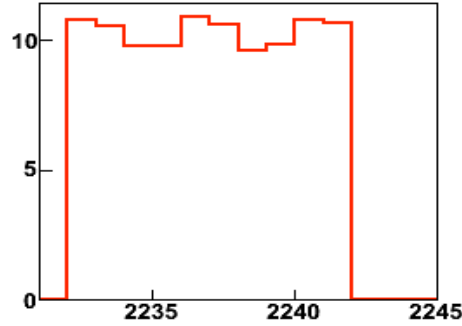


# Pedestal run with Ekaterina setting@0T-

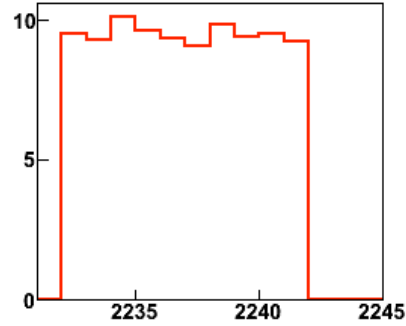
STime\_Sp#01\_Ch#12



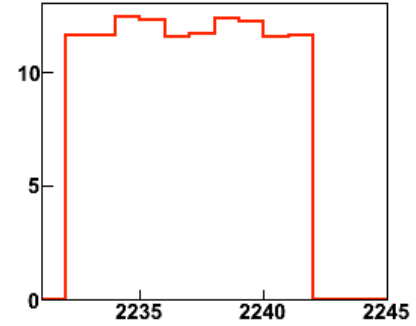
STime\_Sp#01\_Ch#13



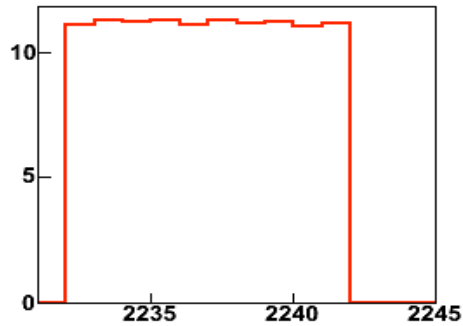
STime\_Sp#01\_Ch#18



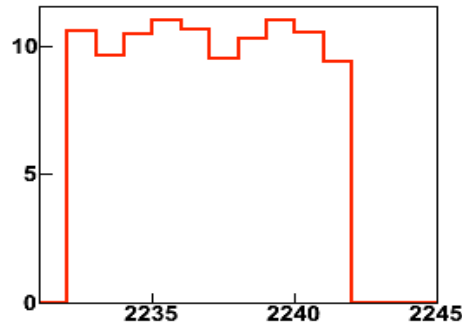
STime\_Sp#01\_Ch#19



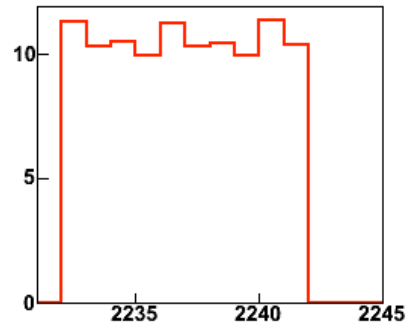
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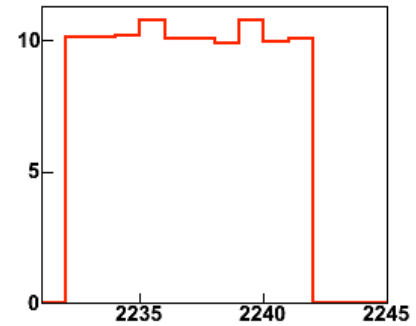
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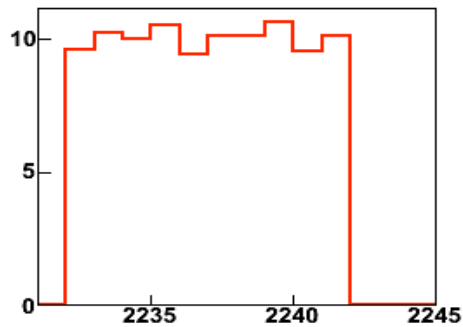
STime\_Sp#01\_Ch#20



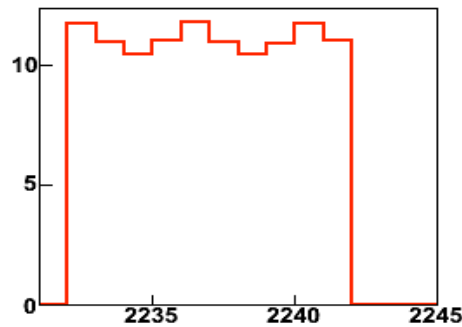
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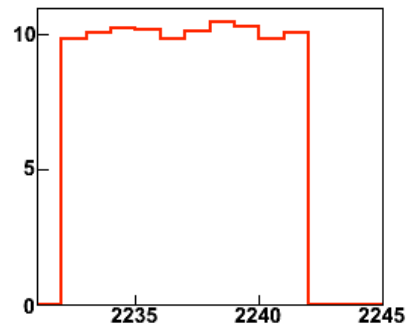
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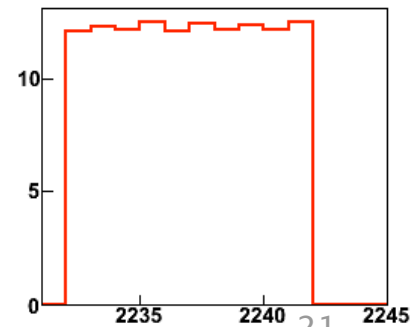
STime\_Sp#01\_Ch#17



STime\_Sp#01\_Ch#22

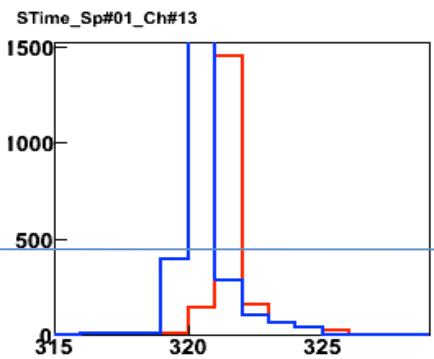
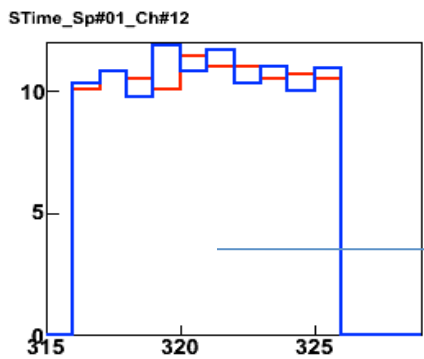


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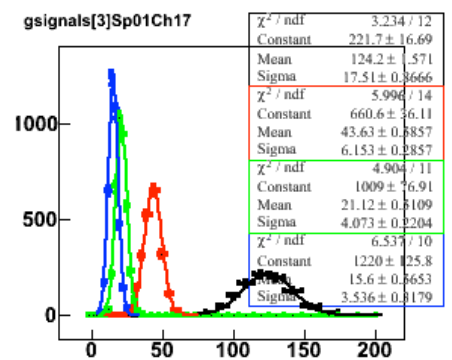
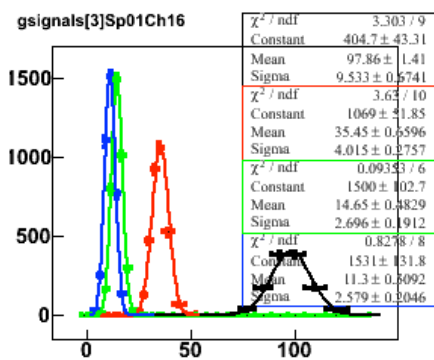
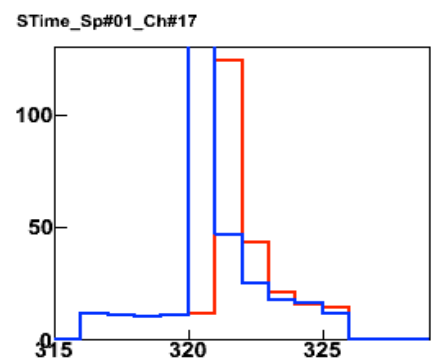
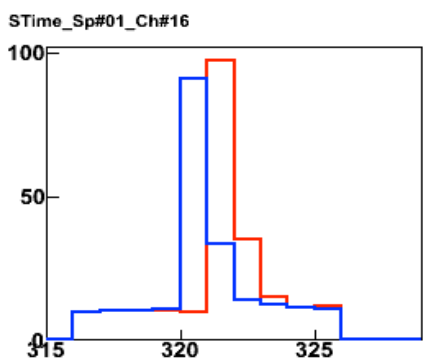
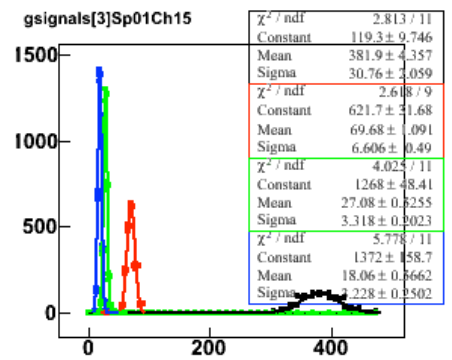
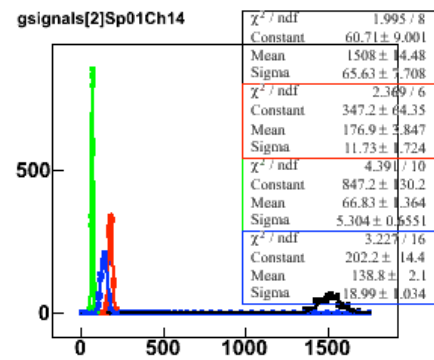
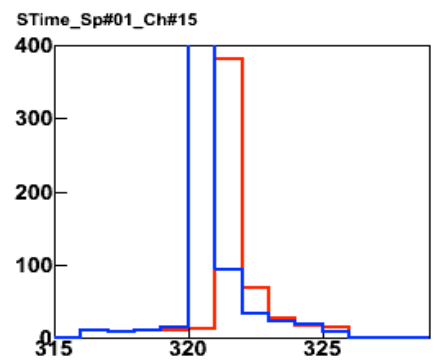
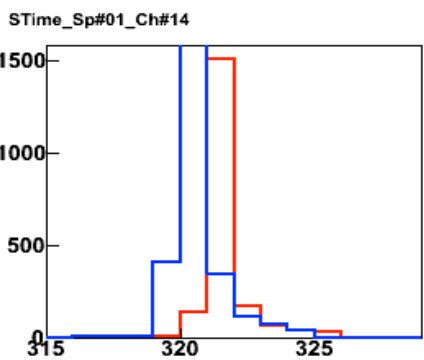
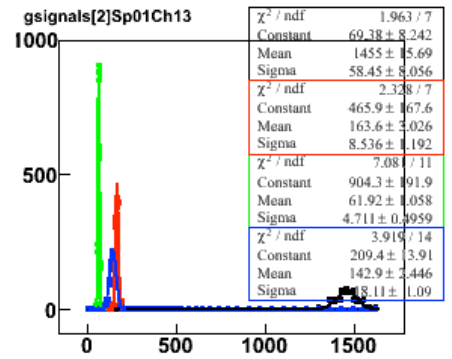


**1000V vs 1100V@3.75T  
spigot1**

# 1000V vs 1100V@3.75T-spigot1

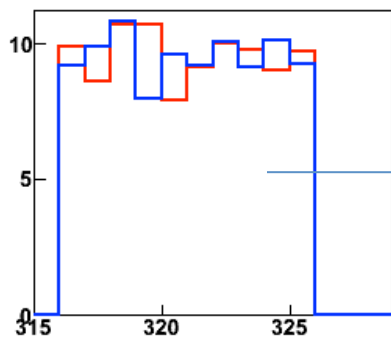


Sinyal yok ch:12

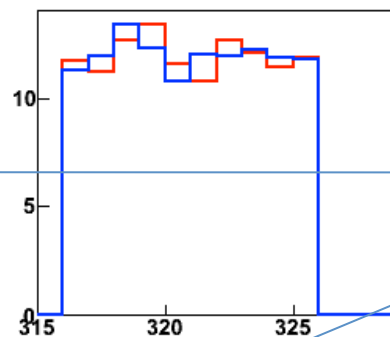


# 1000V vs 1100V@3.75T-spigot1

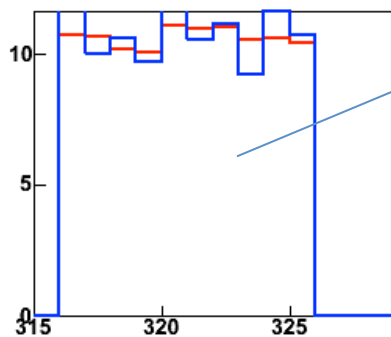
STime\_Sp#01\_Ch#18



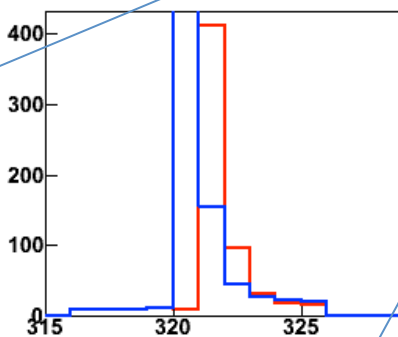
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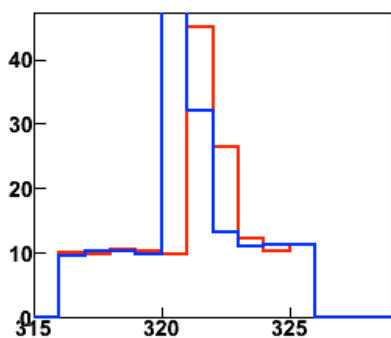
STime\_Sp#01\_Ch#20



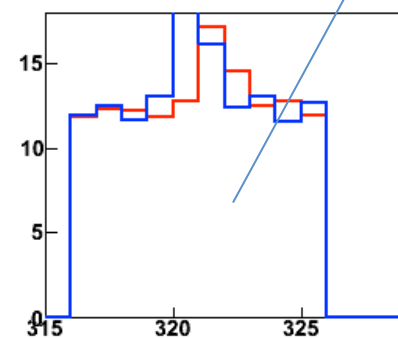
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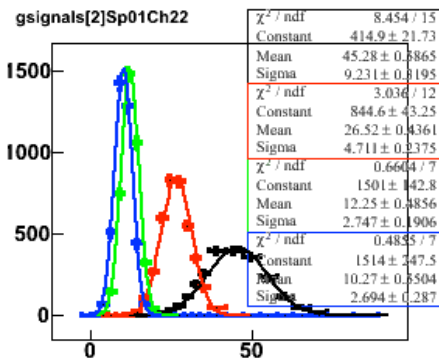
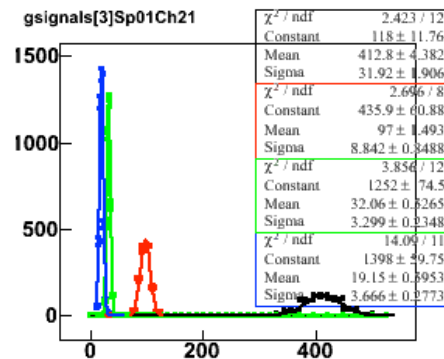
STime\_Sp#01\_Ch#22



STime\_Sp#01\_Ch#23



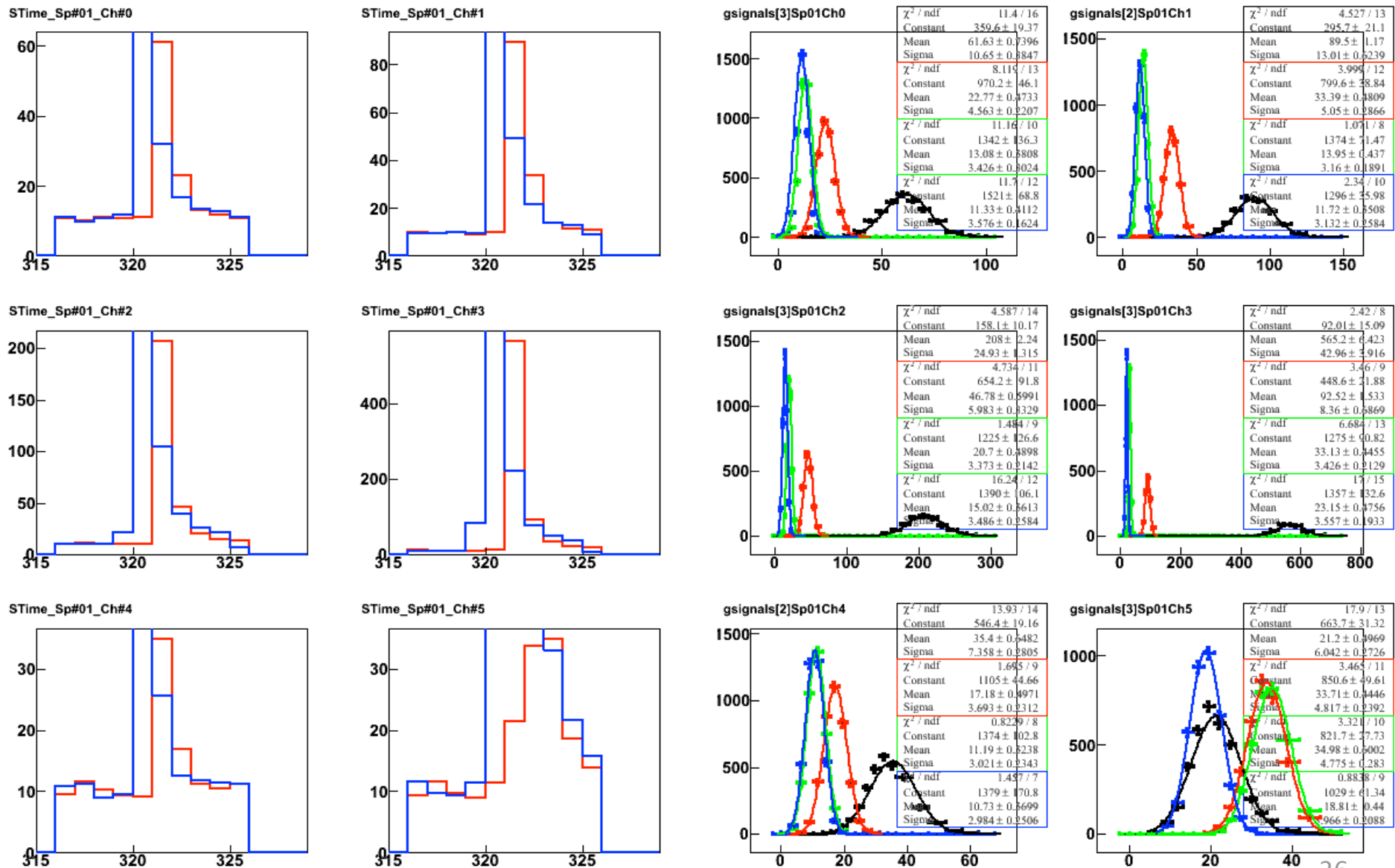
Sinyal yok ch:18-19-20-23



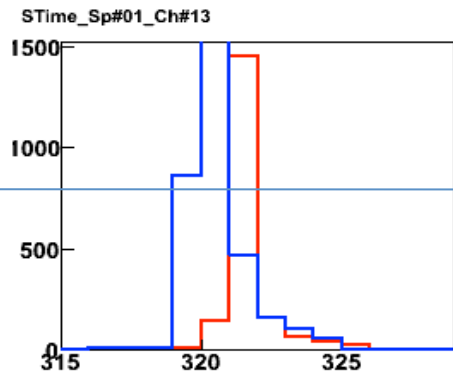
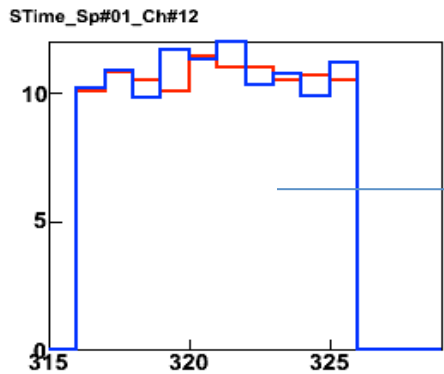


**1000V vs 1200V@3.75T  
spigot1**

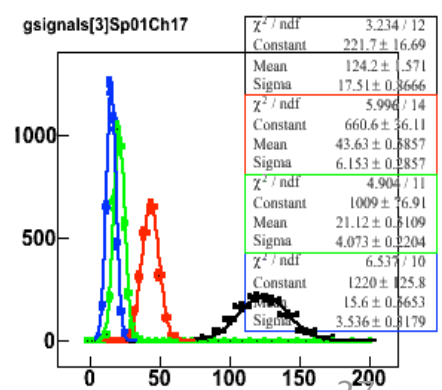
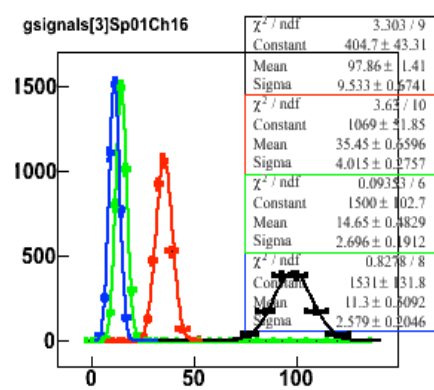
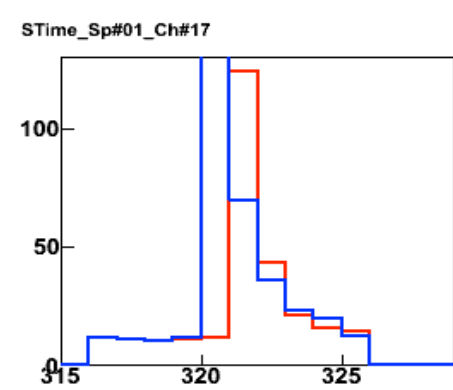
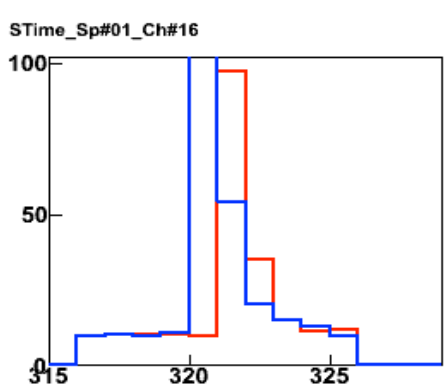
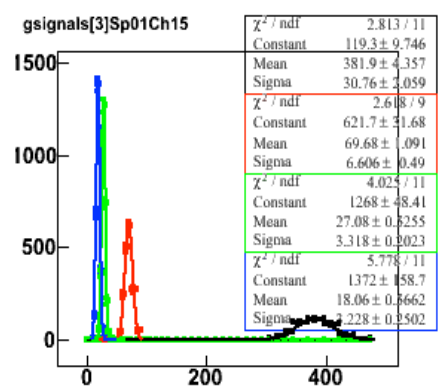
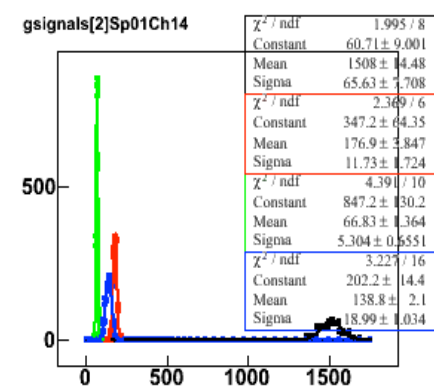
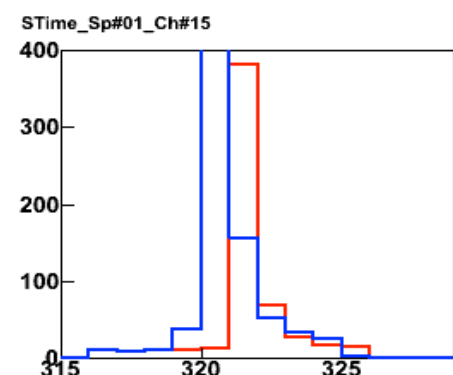
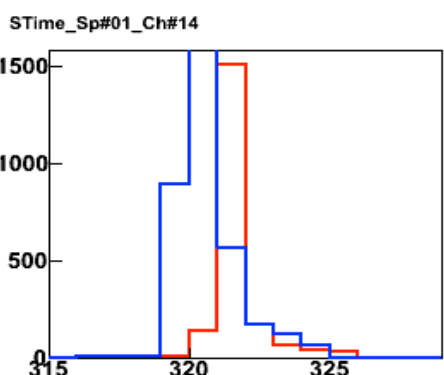
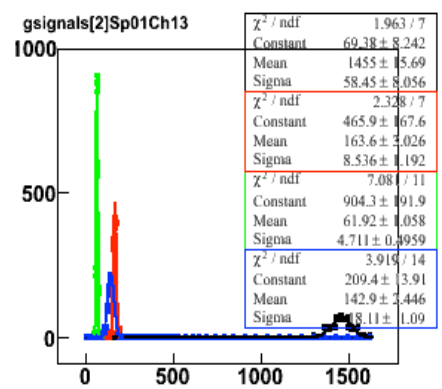
# 1000V vs 1200V@3.75T-spigot1



# 1000V vs 1200V@3.75T-spigot1

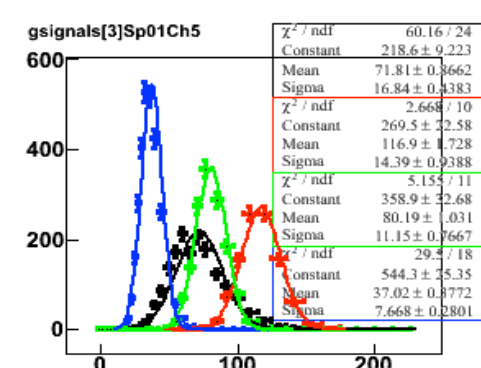
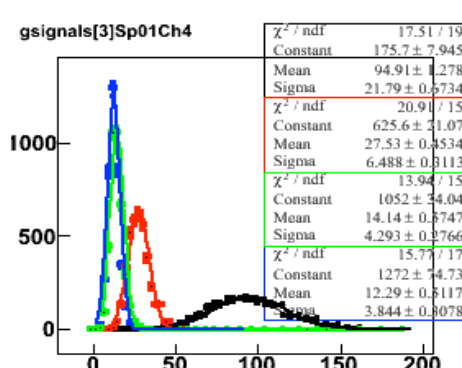
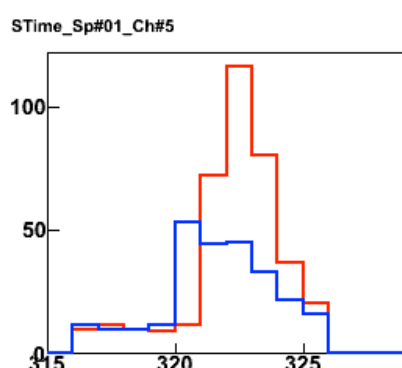
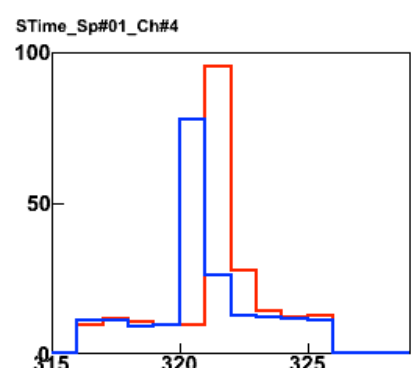
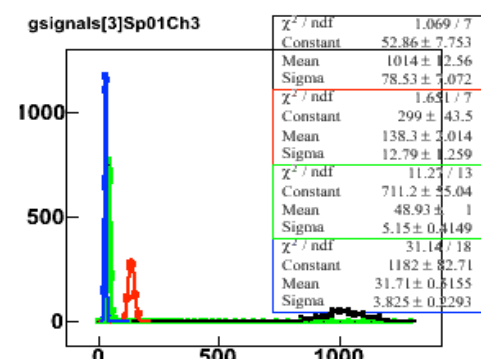
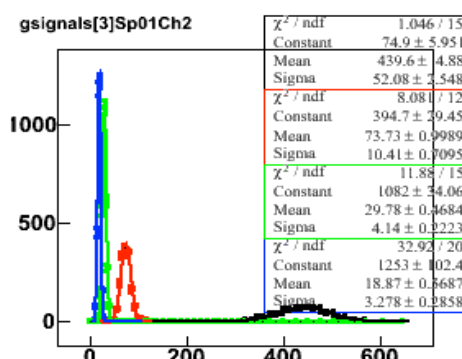
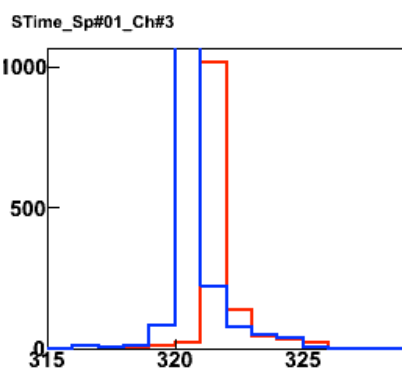
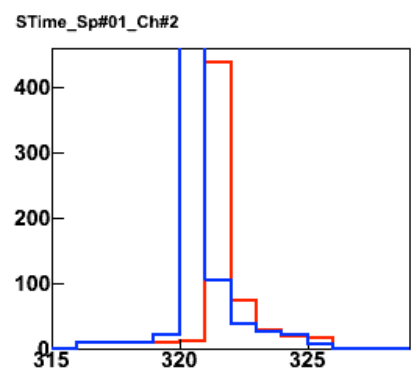
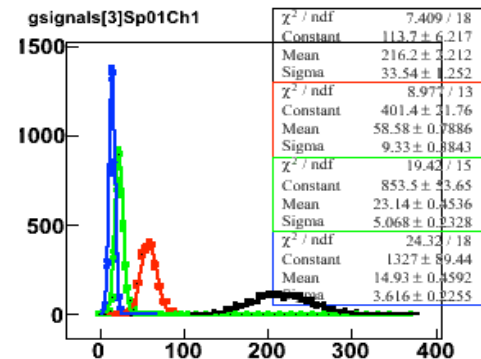
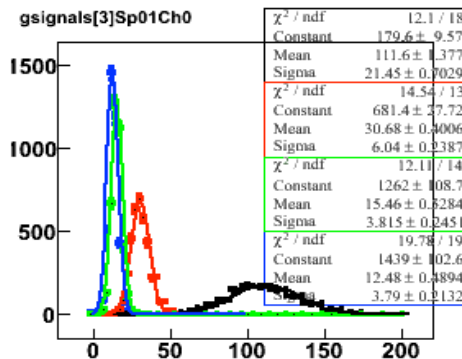
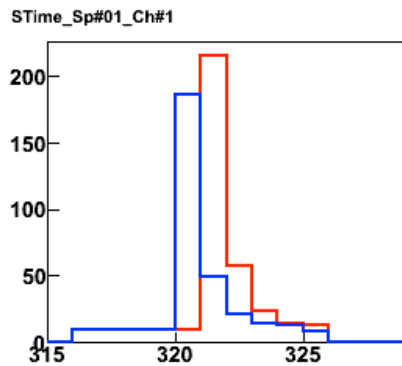
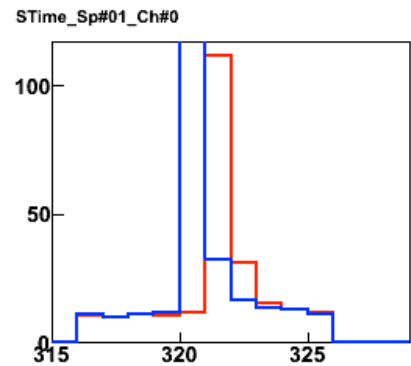


Sinyal yok ch:12

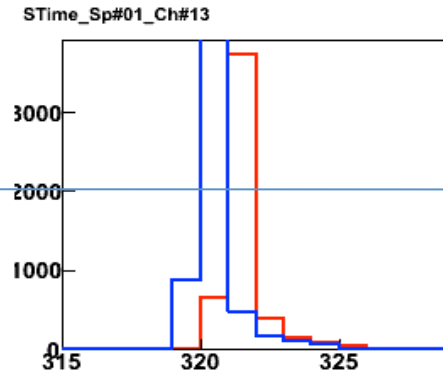
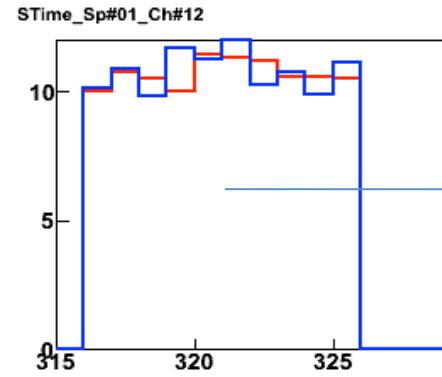


**Ekaterina setting vs  
1200V@3.75T**

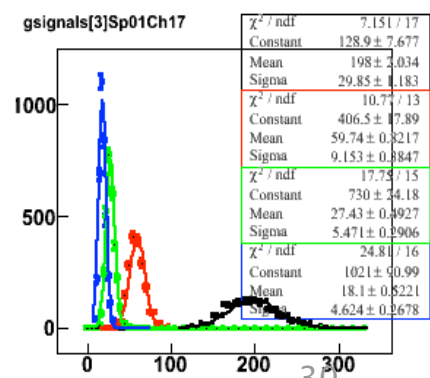
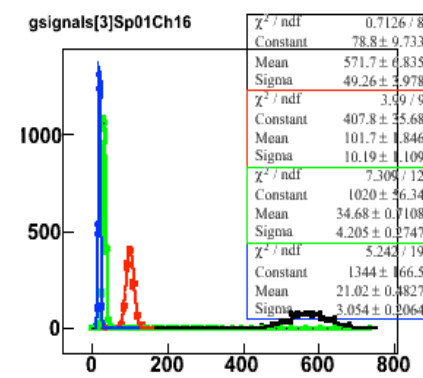
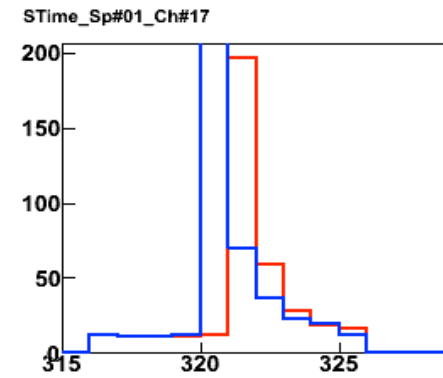
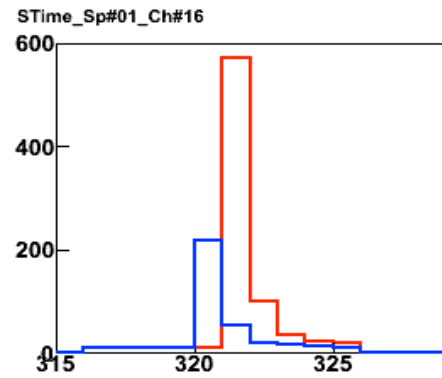
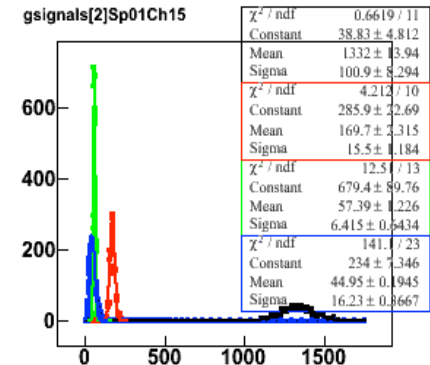
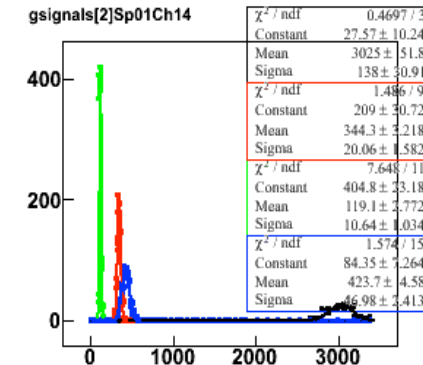
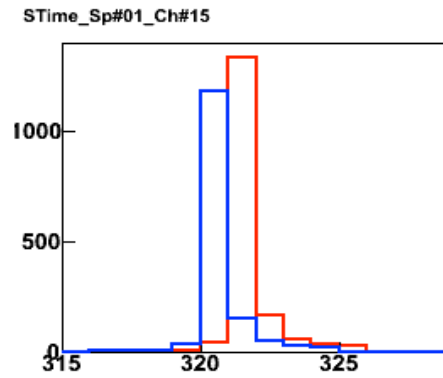
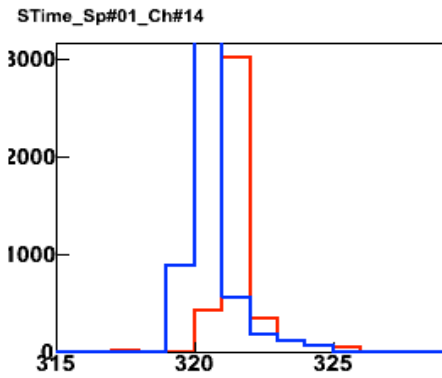
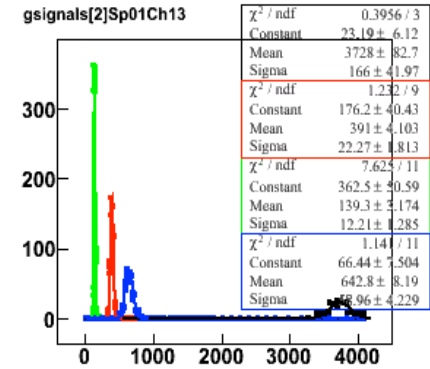
# Ekaterina setting vs 1200V@3.75T-spigot1



# Ekaterina setting vs 1200V@3.75T-spigot1



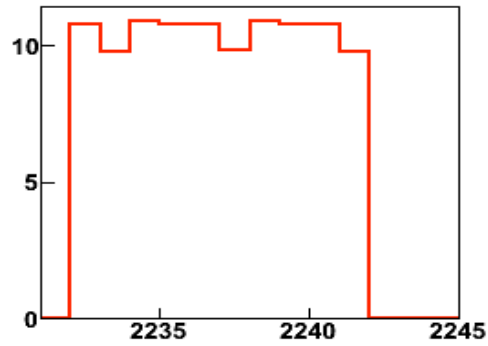
Sinyal yok ch:12



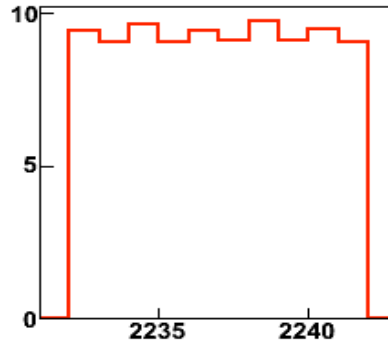
**Pedestal run with  
Ekaterina setting@3.75T-**

# PEDESTAL (Her module farklı voltaj )@3.75T-

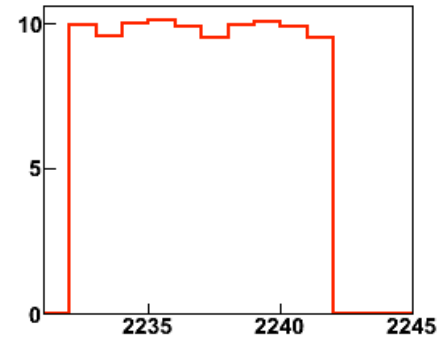
STime\_Sp#01\_Ch#0



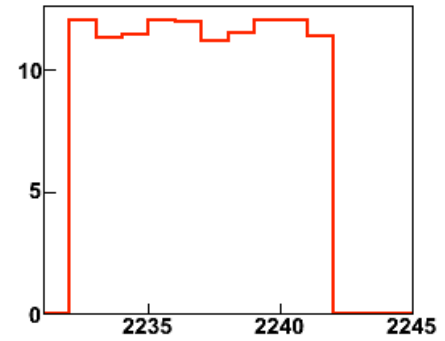
STime\_Sp#01\_Ch#1



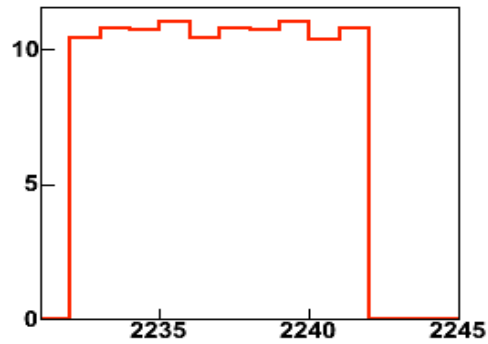
STime\_Sp#01\_Ch#6



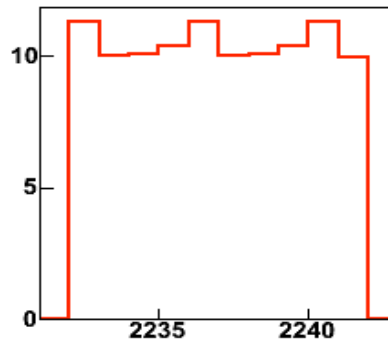
STime\_Sp#01\_Ch#7



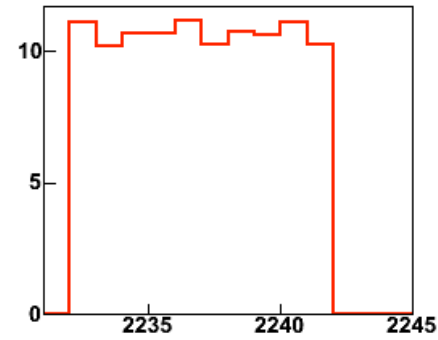
STime\_Sp#01\_Ch#2



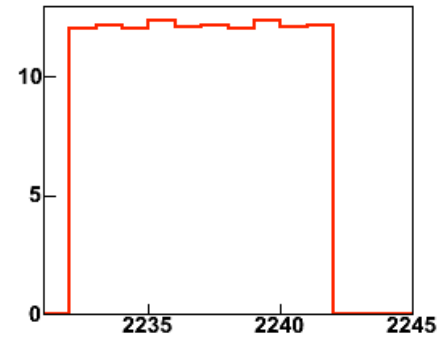
STime\_Sp#01\_Ch#3



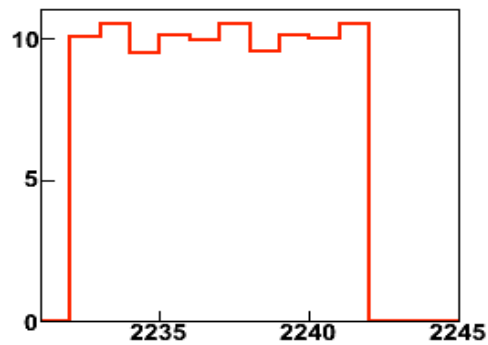
STime\_Sp#01\_Ch#8



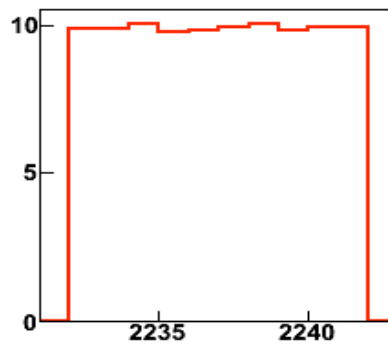
STime\_Sp#01\_Ch#9



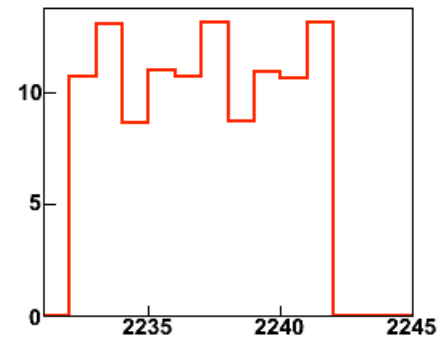
STime\_Sp#01\_Ch#4



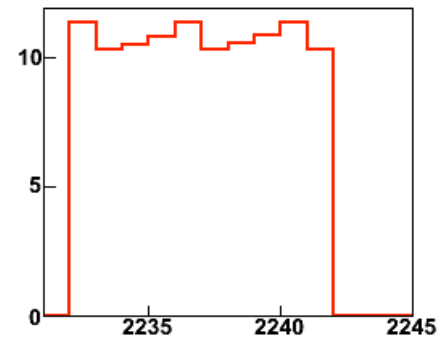
STime\_Sp#01\_Ch#5



STime\_Sp#01\_Ch#10

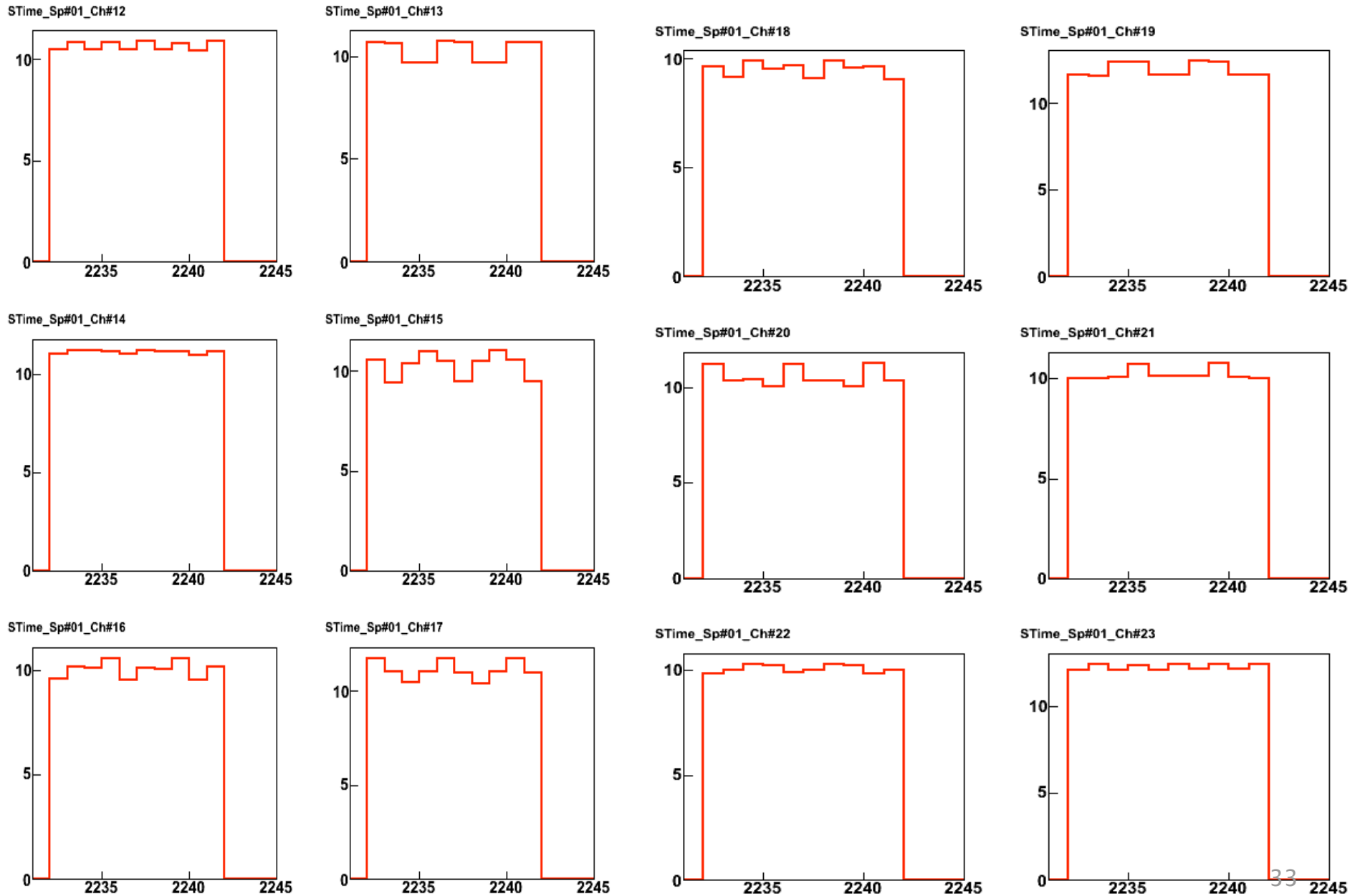


STime\_Sp#01\_Ch#11





# PEDESTAL@Ekaterina setting @3.75T-



# SONUÇLAR

- Hem 0T hemde 3.75T için 1000V vs 1200V 'ta sp#01 ch:12 için sinyal gözlemlenmemiştir
- 3.75T'da 1000 vs 1100V ve 1000 vs 1200V'da sp#01 ch:18-19-20-23 için sinyal yok
- 3.75 T için ekaterinanın settinginde sp#01 ch: 7-12-18-19-20-13 için sinyal yok
- En büyük gaussiyan mean değeri siyah pikte görülmüştür.

# **Farklı manyetik alanda aynı voltajda alınan datanın analizi**

**0T vs.3.75 T-1000V**

**0T vs.3.75 T-1200V**

# RUN DETAYLARI

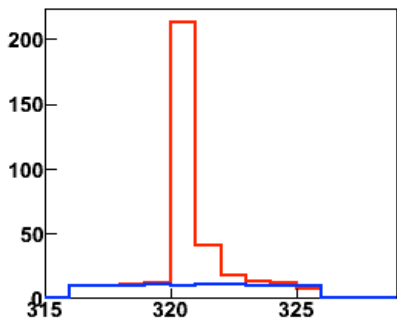
Run number	Events	HV status(V)	Led status	Magnet (T)
122419	10K	1000/60	ON	0
122396	10K	1200/70	ON	0
123526	10K	1000/60	ON	3.75
123514	10K	1200/70	ON	3.75

Bu çalışmada yeni mapping kullanıldı.  
(**emap\_3dcc\_noncmssw\_Fri\_Nov\_20\_2009.txt**) ve kasımın sonu aralığın başında alınan datalar analiz edildi.

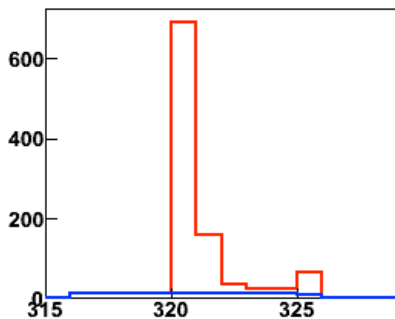
**B=0T vs.3.75T @1000V→ spigot1**

# B=0T vs. 3.75T spigot1@1000V

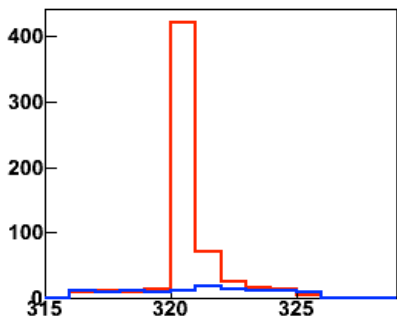
STime\_Sp#01\_Ch#6



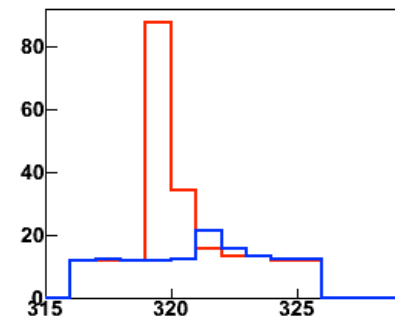
STime\_Sp#01\_Ch#7



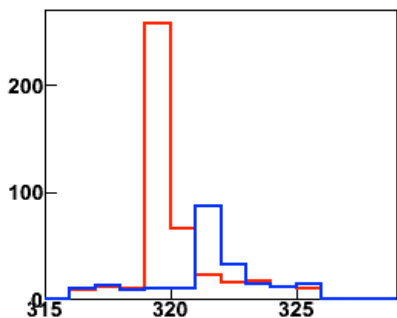
STime\_Sp#01\_Ch#8



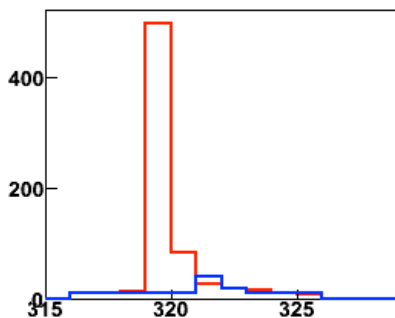
STime\_Sp#01\_Ch#9



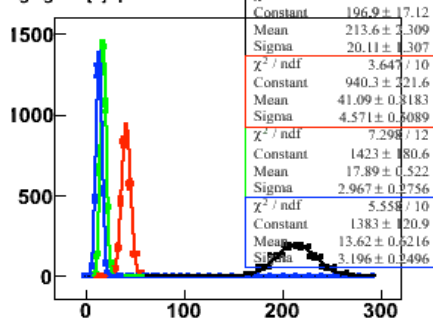
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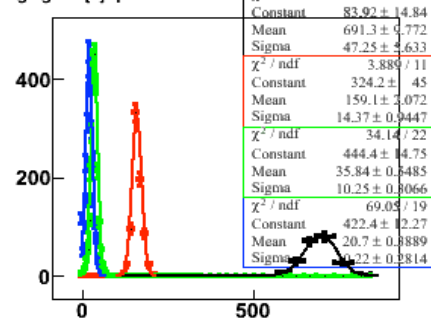
STime\_Sp#01\_Ch#11



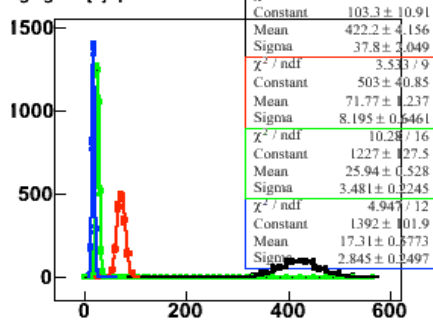
gsignals[2]Sp01Ch6



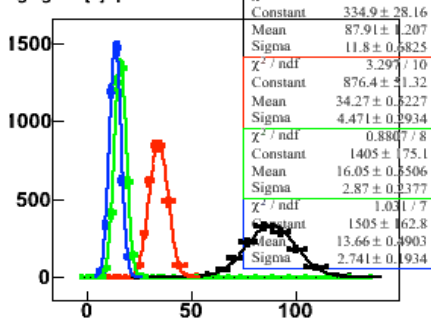
gsignals[3]Sp01Ch7



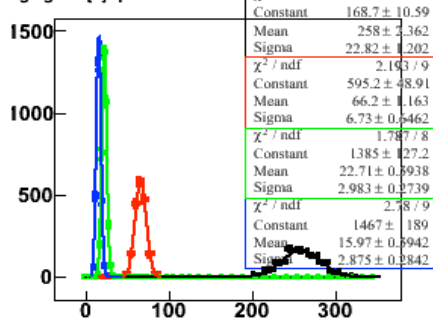
gsignals[3]Sp01Ch8



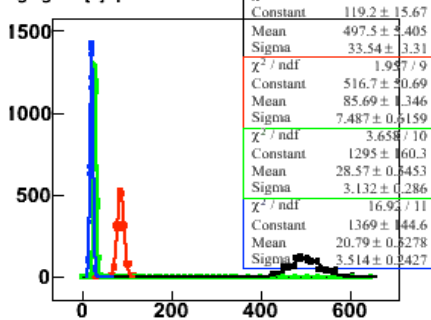
gsignals[3]Sp01Ch9



gsignals[3]Sp01Ch10

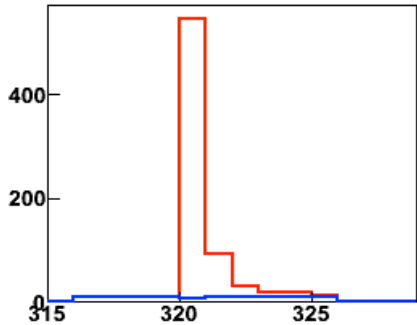


gsignals[3]Sp01Ch11

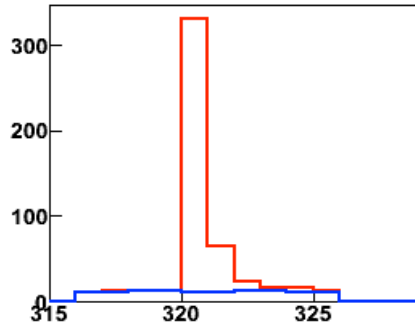


# B=0T vs. 3.75T spigot1@1000V

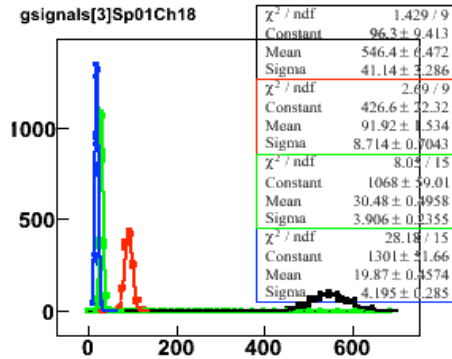
STime\_Sp#01\_Ch#18



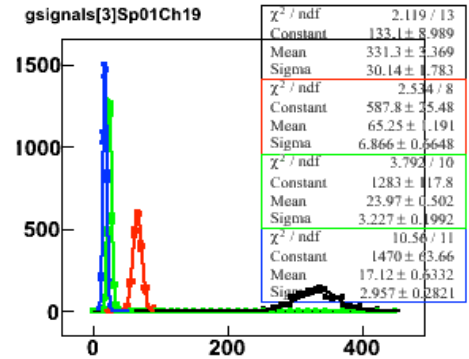
STime\_Sp#01\_Ch#19



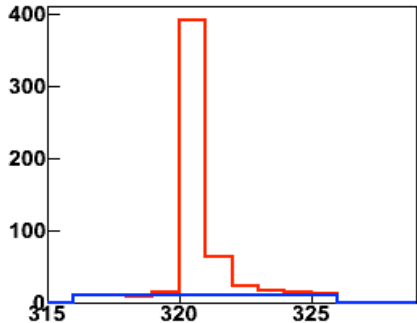
gsignals[3]Sp01Ch18



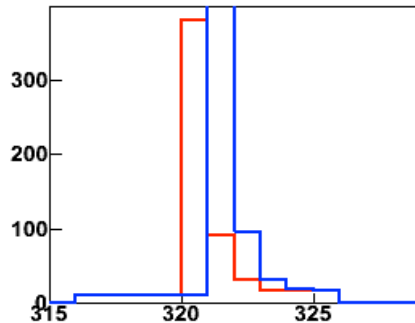
gsignals[3]Sp01Ch19



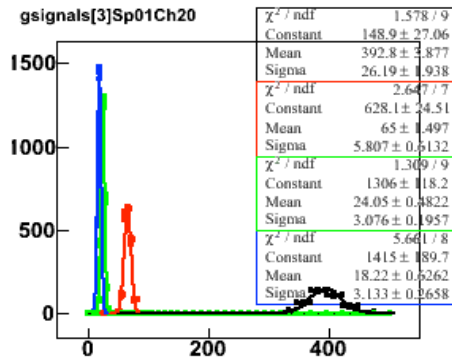
STime\_Sp#01\_Ch#20



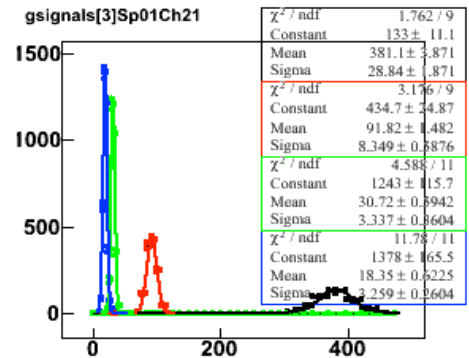
STime\_Sp#01\_Ch#21



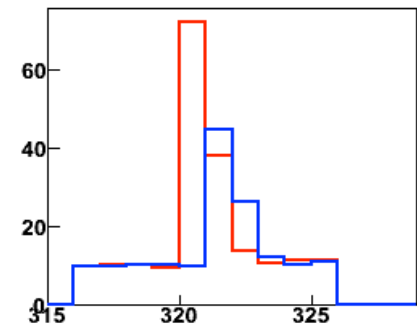
gsignals[3]Sp01Ch20



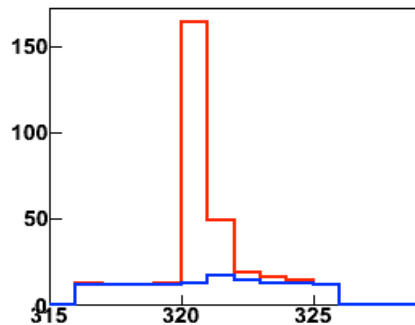
gsignals[3]Sp01Ch21



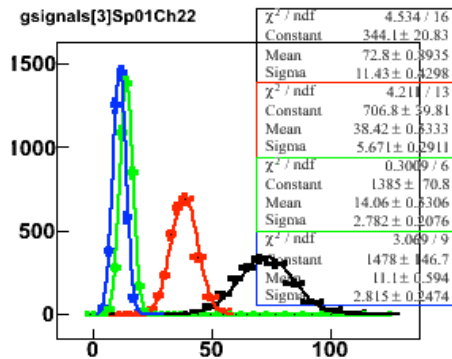
STime\_Sp#01\_Ch#22



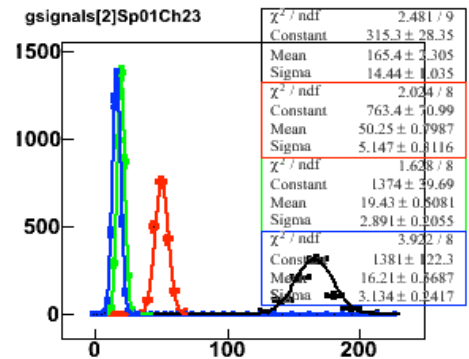
STime\_Sp#01\_Ch#23



gsignals[3]Sp01Ch22



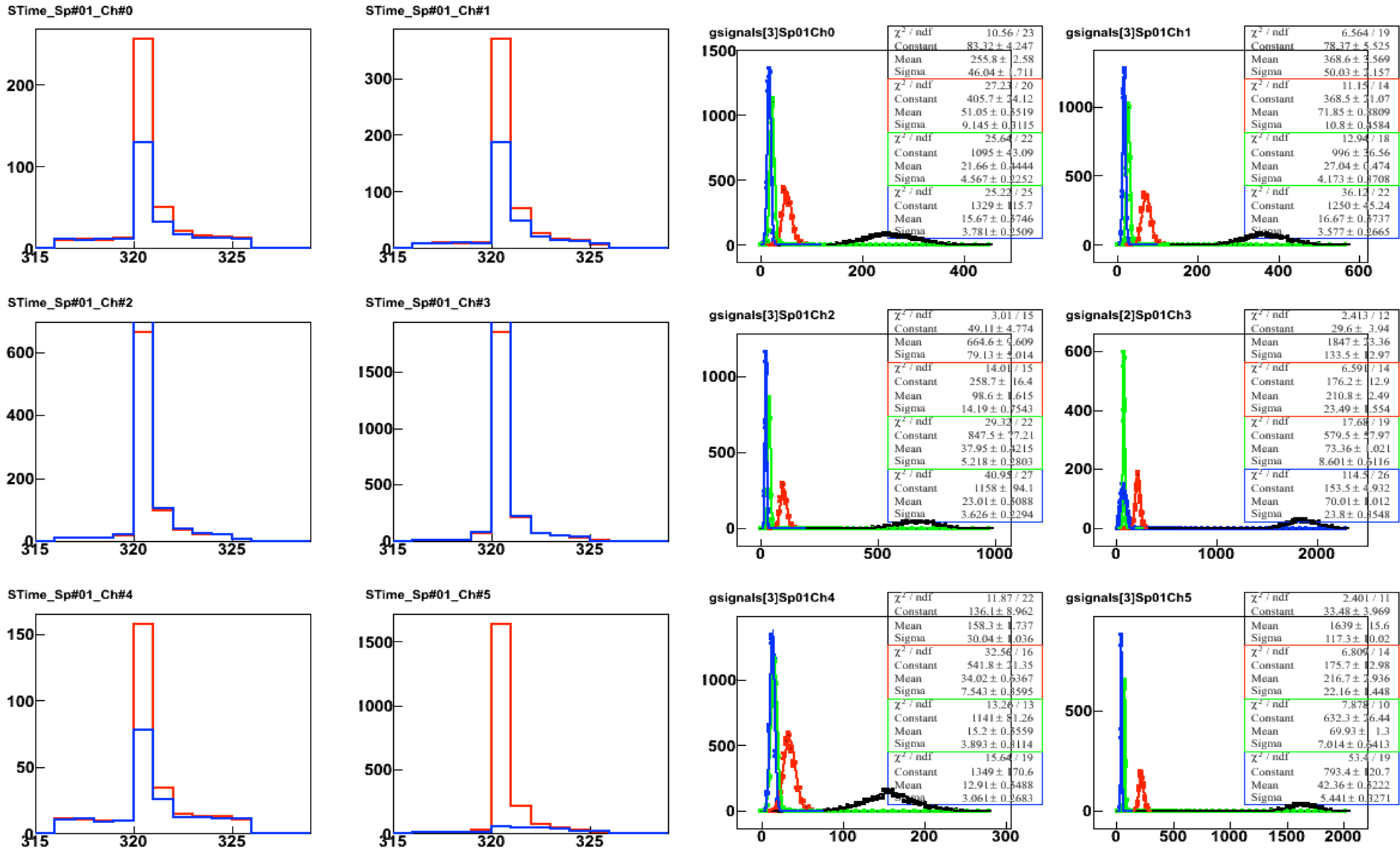
gsignals[2]Sp01Ch23



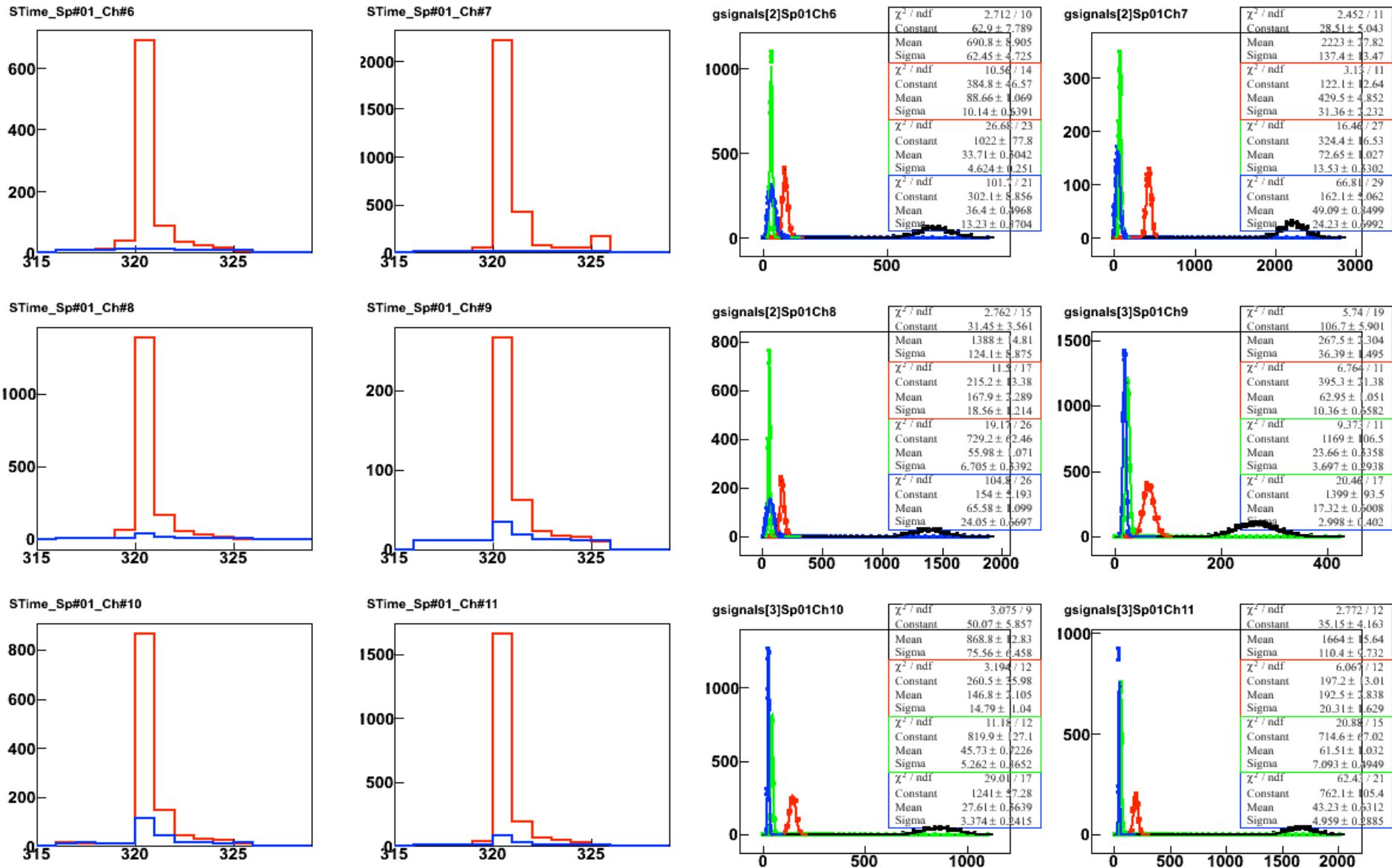
**B=0T vs.3.75T @1200V→ spigot1**



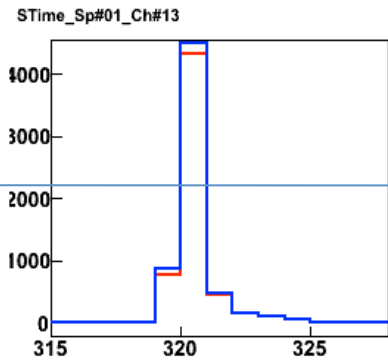
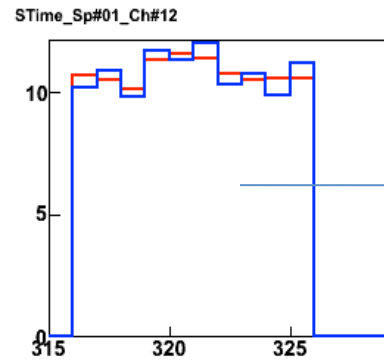
# B=0T vs. 3.75T spigot1@1200V



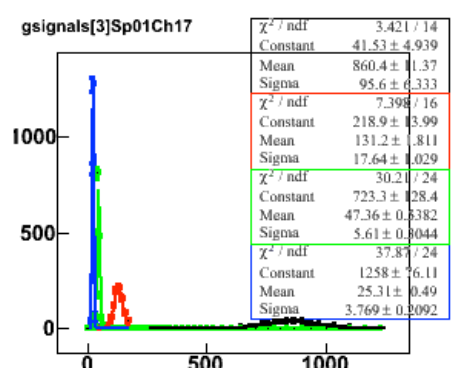
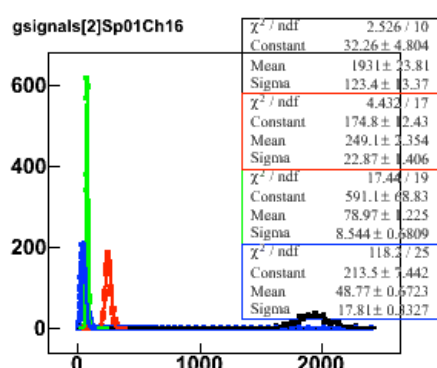
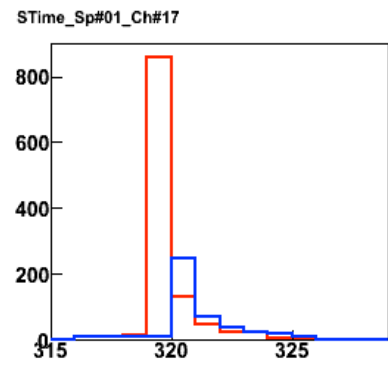
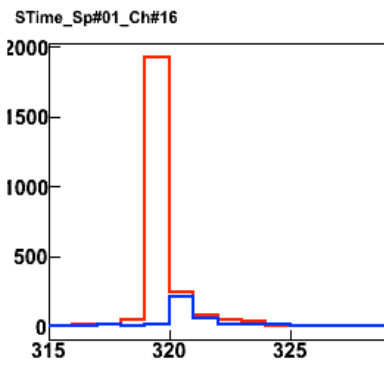
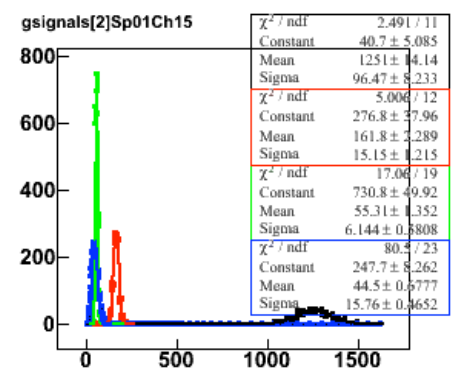
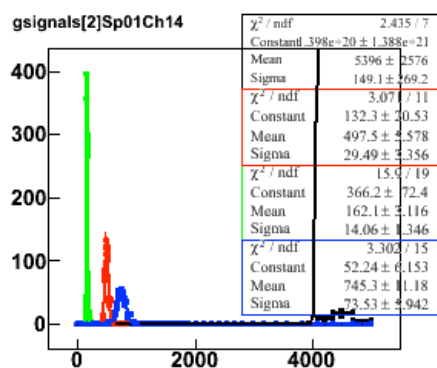
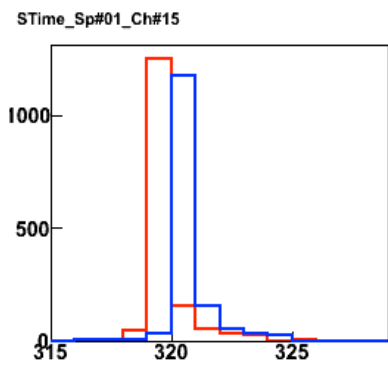
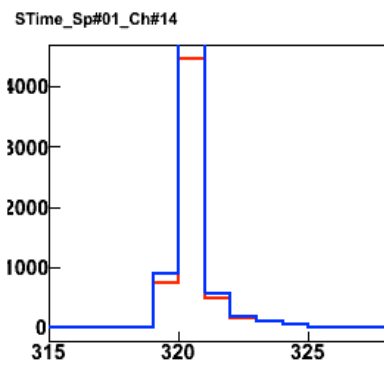
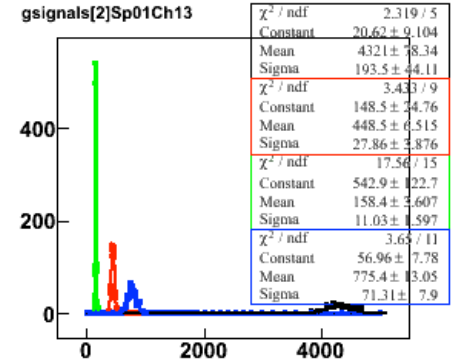
# B=0T vs. 3.75T spigot1@1200V



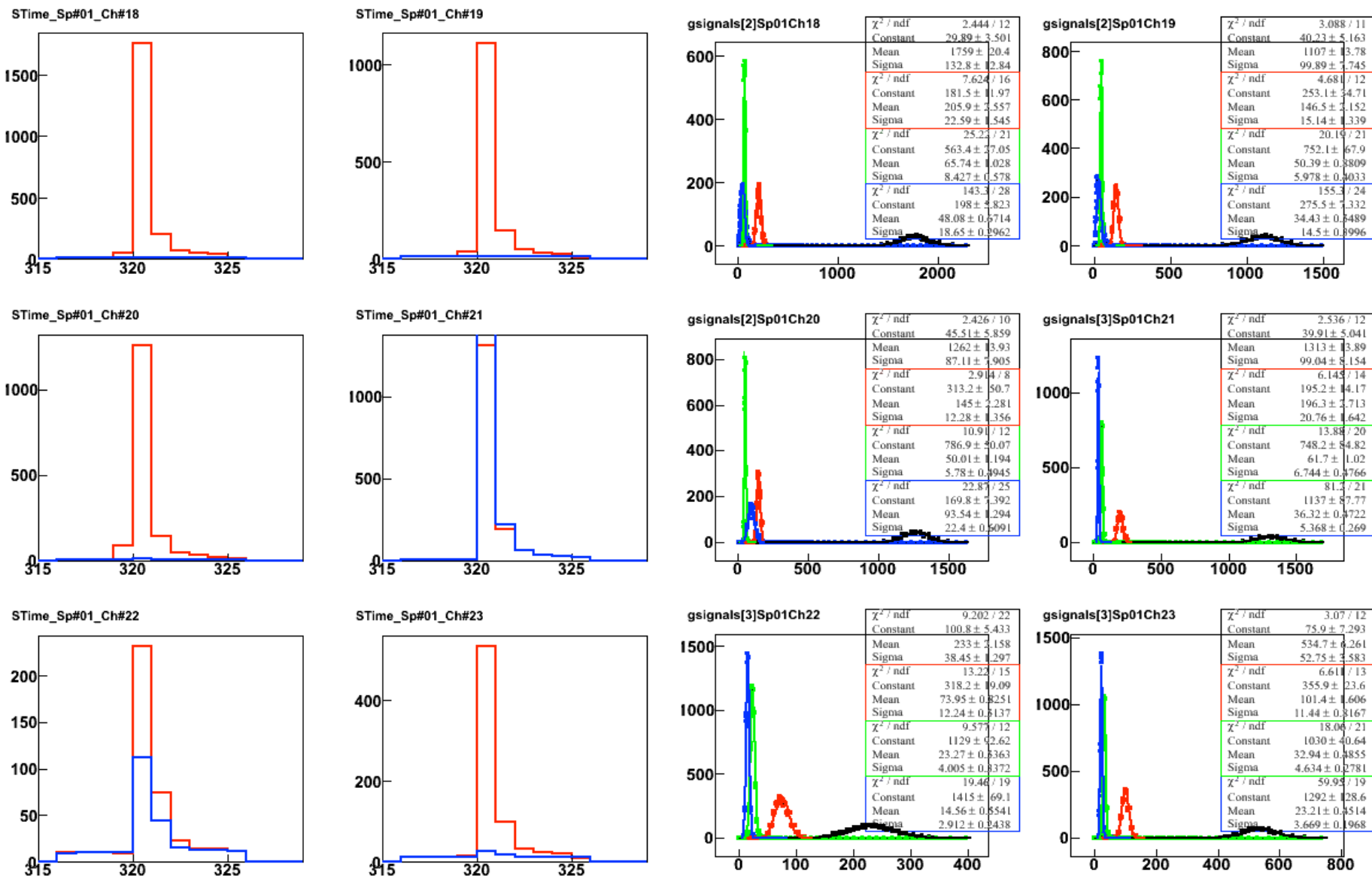
# B=0T vs. 3.75T spigot1@1200V



Sinyal yok



# B=0T vs. 3.75T spigot1@1200V



# SONUÇLAR

- **0T-3.75T@1000V ve 0T-3.75T@1200V spigot1 ch:12de sinyal y**
- **Aynı zamanda bazı plotlarda 3.75T'da sinyal gözlemlerken 0T'da g**
- **Bunun tam tersi durumlarda söz konusudur.**
- **En büyük gaussiyan mean değeri siyah pikte görülmüştür.  
( spg1-ch12 hariç).**

# GLOBAL DQM OFFLINE PLOTLARI.

# RUN DETAYI

RUN: 120020

Events: 3540

LED status: OFF

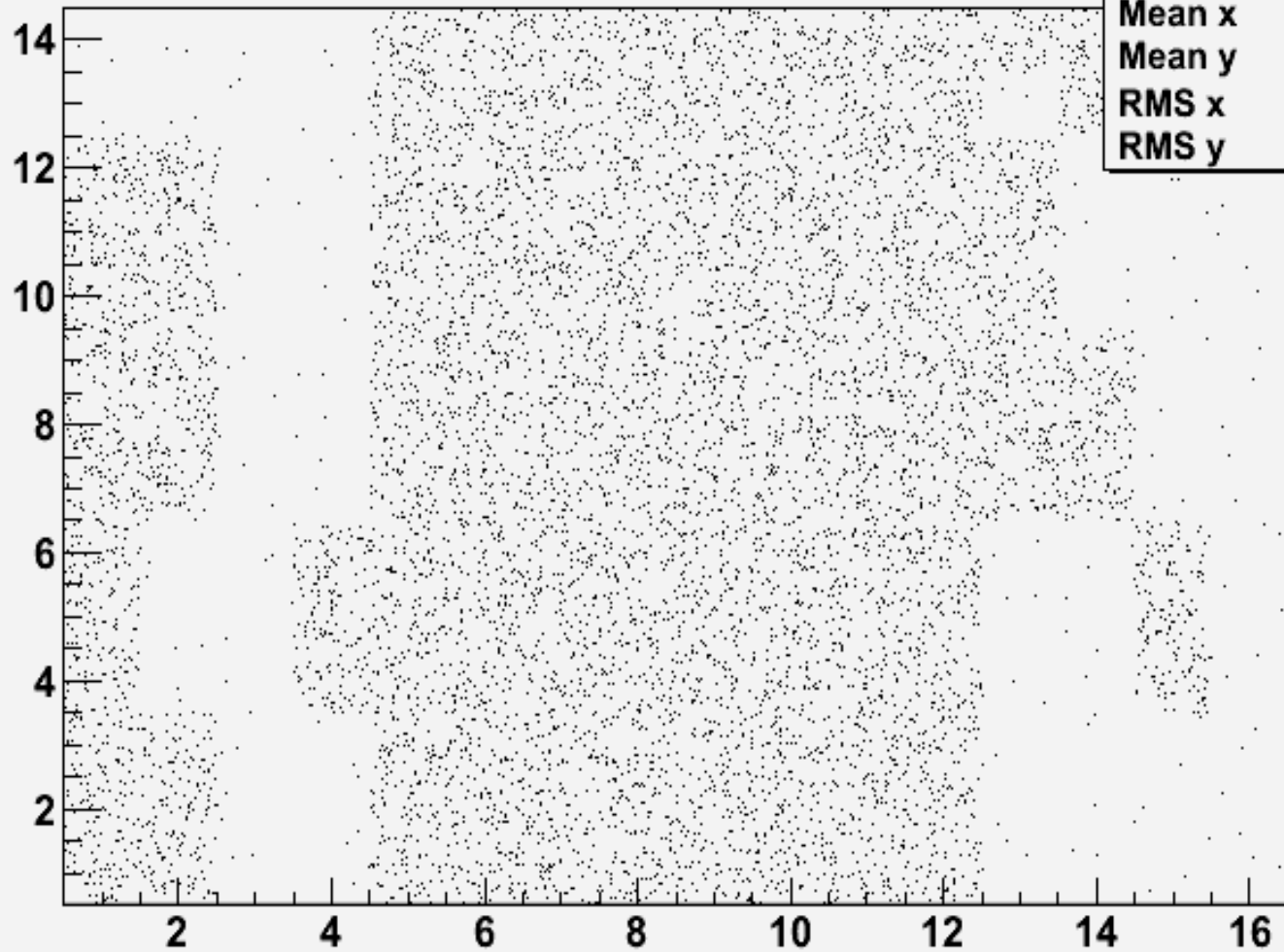
B: 3.8T

HV: 1200/70 V

# MAPPING VE DATABASE DEĞİŞMEDEN ÖNCE



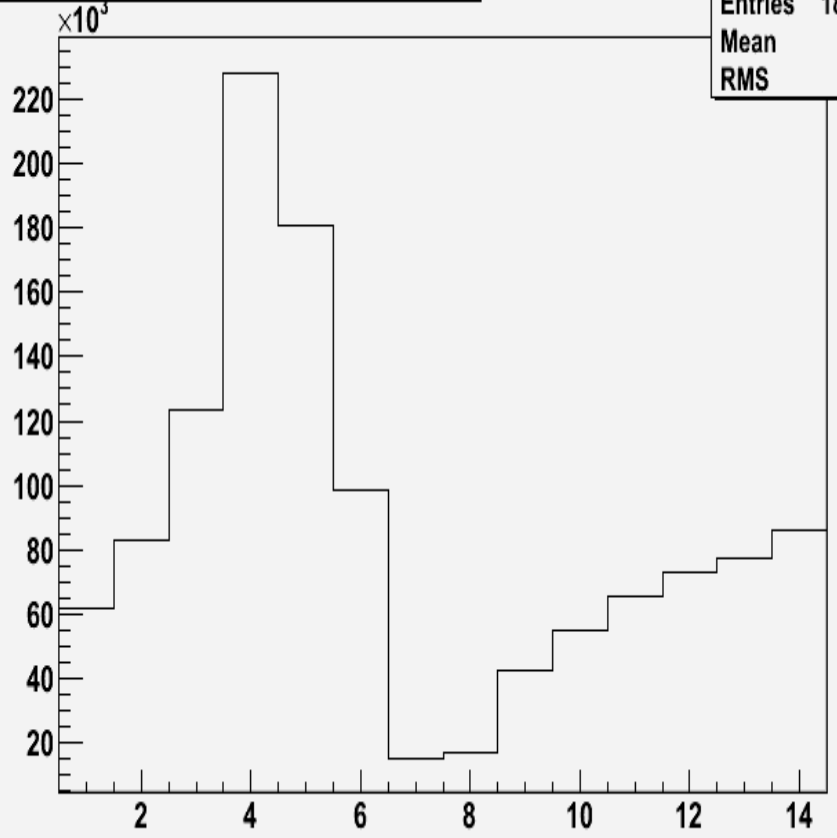
## CastorRecHits occupancy



CastorRecHits occupancy

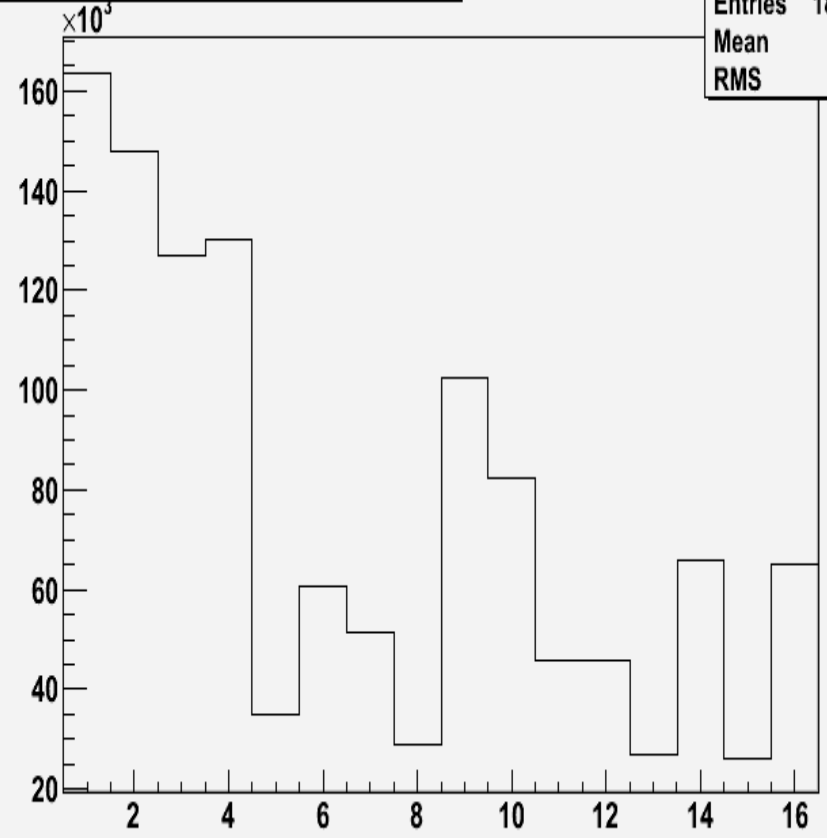
<b>Entries</b>	<b>182210</b>
<b>Mean x</b>	<b>8.482</b>
<b>Mean y</b>	<b>7.506</b>
<b>RMS x</b>	<b>4.578</b>
<b>RMS y</b>	<b>4.028</b>

**CastorRecHits Energy in modules**



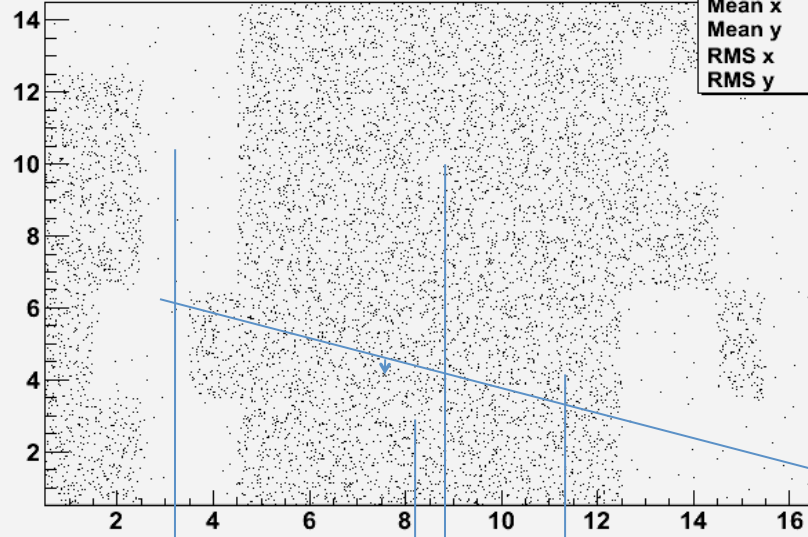
CastorRecHits Energy in modules	
Entries	182210
Mean	6.611
RMS	4.022

**CastorRecHits Energy in sectors**



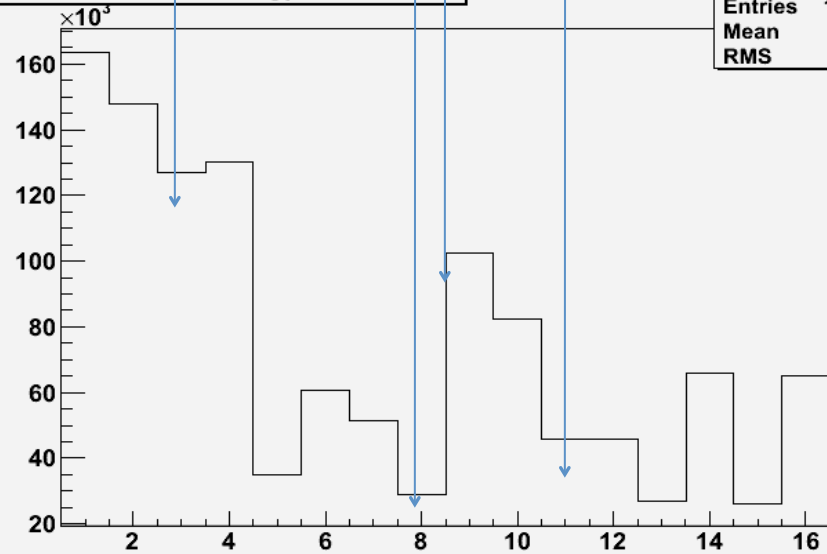
CastorRecHits Energy in sectors	
Entries	182210
Mean	6.636
RMS	4.736

CastorRecHits occupancy



CastorRecHits occupancy	
Entries	182210
Mean x	8.482
Mean y	7.506
RMS x	4.578
RMS y	4.028

CastorRecHits Energy in sectors



CastorRecHits Energy in sectors	
Entries	182210
Mean	6.636
RMS	4.736

**NEDEN ???**

# MAPPING VE DATABASE DEĞİŞTİKTEN SONRA

# CastorRecHitEn erji (Modülde)

3.8T

