TB-2017 SETTING MEASUREMENTS

UPDATE

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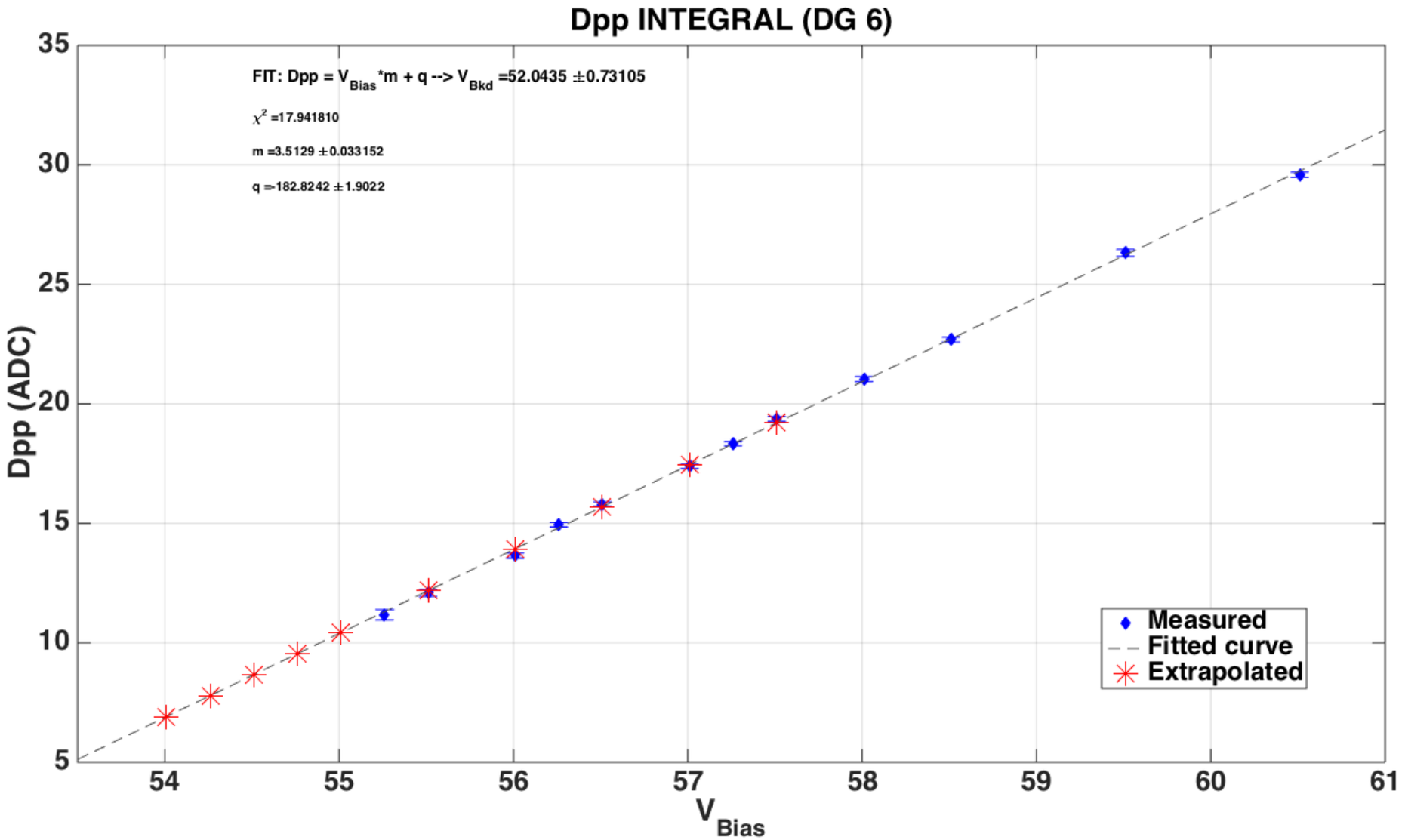
COMO - 06/28/2017

DPP MEASUREMENT

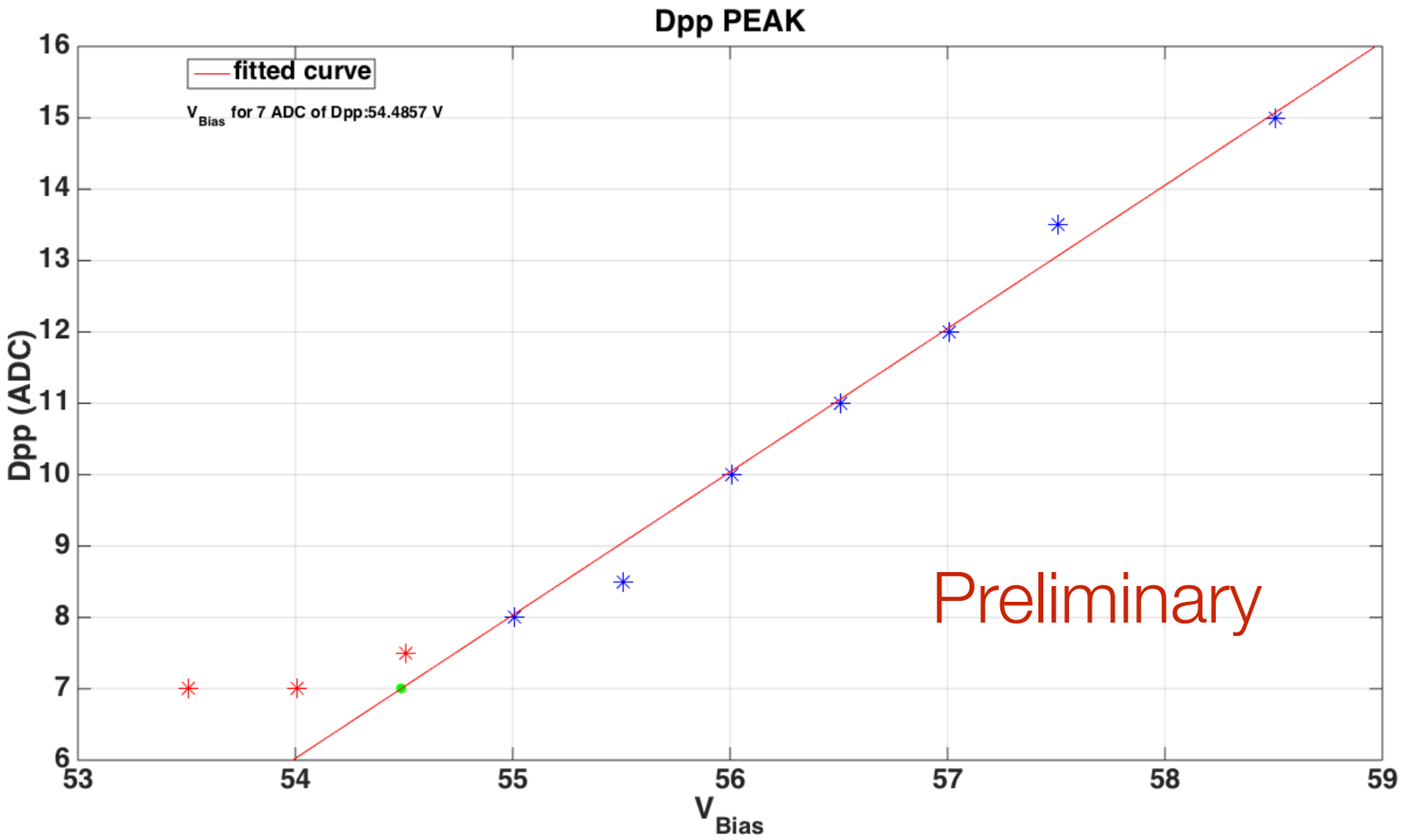
- Nominal V_{op}: **57.51 V** (from 57.25 V to 57.51 V) —> individual adjustment until **3 V**
- Parameters configuration **improved** —> Multi-photon available until ~ **55.00 V**
- Better extrapolation of Dpp for **low** V_{Bias}



DYNAMIC RANGE

- **1584 cells** for each SiPM (25 um pitch)
- **16 384 ADC** available channels (14 bit)
- Baseline of **5000 ADC** —> **11 384** ADC channels
- Number of possible fired cells: ~ **875** for V_{Bias} = 57.51 V (13 ADC of Dpp)

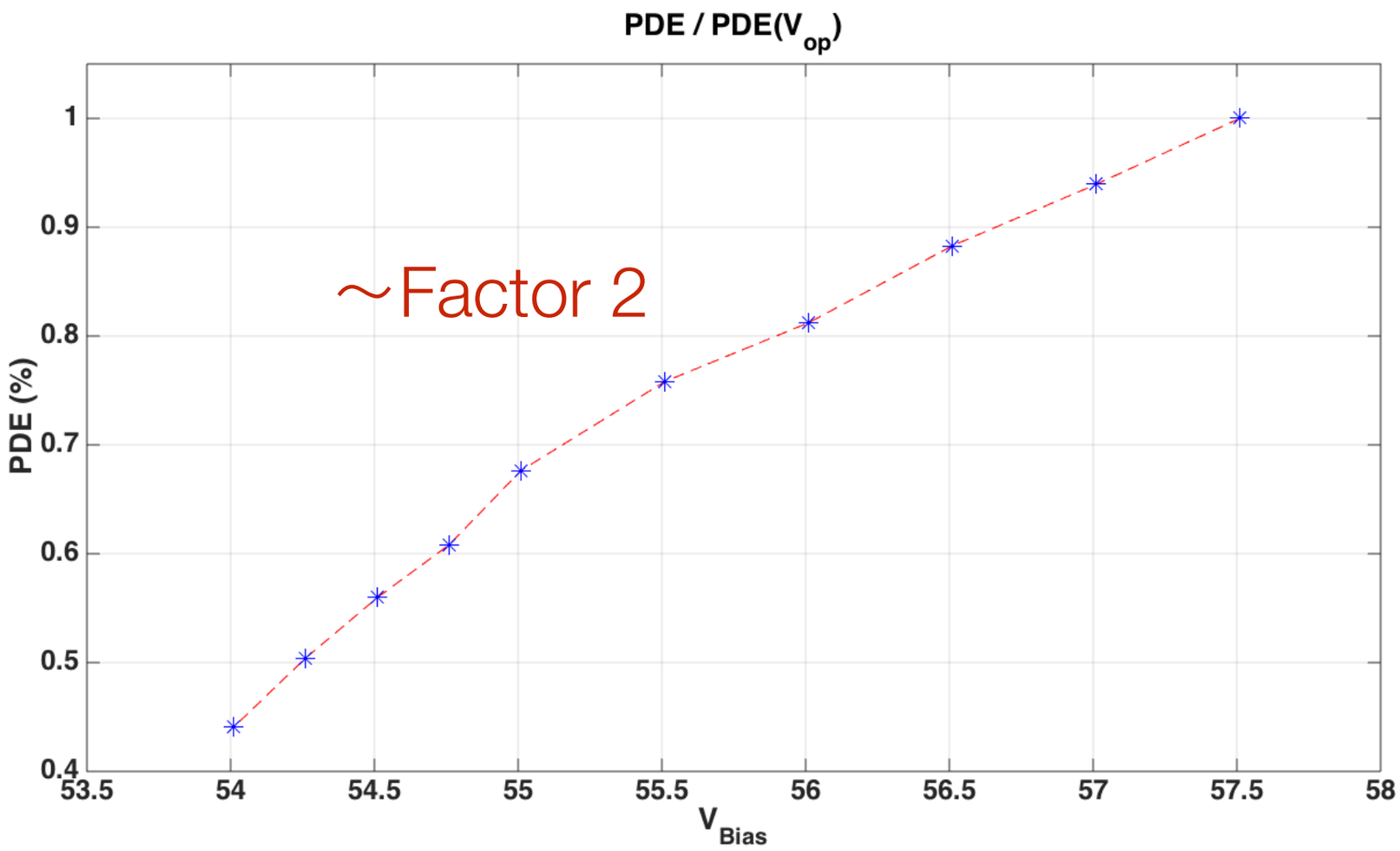
  No saturation —> ~ **1626** for V_{Bias} = 54.51 V (7 ADC of Dpp)



PDE MEASUREMENT

- Light for ~ **332** fired cells (V_{Bias} = 57.51 V) —> 21% of total cells
- Occupancy and PDE correction:

$$N_{fired} = N_{cells}\left(1 - e^{-\frac{\#Ph*PDE}{N_{cells}}}\right)$$



SCINTILLATING LIGHT

- Upper limit: **100 GeV** of e^- beam —> **5%** of sampling fraction
- Energy deposited in the module: ~ **40%** —> **2 GeV**
- Scintillating photons: 2000(MeV)*10000(Ph/MeV)*3%*80% = **480 000 Ph**
- Uniform distribution on 32 SiPM: **15 000 Ph/SiPM**
- Negligible X_{Talk} and After Pulse ~ 1%
- Occupancy and PDE correction:

$$N_{fired} = N_{cells}\left(1 - e^{-\frac{\#Ph*PDE}{N_{cells}}}\right)$$

- **Two Bias options:**
  - V_{Bias} = 57.51 V with **PDE**: ~ **25%**
  - V_{Bias} = 54.51 V with **PDE**: ~ **14%**

SCINTILLATING LIGHT

Some numbers

Energy	expected photons per fiber	V_bias	PDE considered	Number of fired cells	SiPM occupancy
100 GeV	15000	nominal	25%	1436	90%
100 GeV	15000	nominal - 3V	14%	1163	73%
10 GeV	1500	nominal	25%	334	21%
10 GeV	1500	nominal - 3V	14%	197	12%

OPEN DISCUSSION

Two possible scenarios:

- Operate the SiMPs connected to the scintillation fibres with lower Bias (nominal - 3V)

- Adjust the amplifier of the SiMPs connected to the scintillation fibres in such a way to avoid the analogue saturation