

VBSCan: 2nd VBSCan Annual meeting

WG1: theoretical understanding



20th of June 2018 - Thessaloniki

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Outline

- Topics of interest of WG1
- Review of activities
(meetings/workshops, STSMs)
- What is ...
 - Done
 - On-going
 - To be done (or not)
- Program of the workshop for WG1

Topics of interest for WG1(1)

- Standard Model predictions
 - Higher-order predictions
 - Suggestion of measurements
 - Study of polarisations
 - ...
- Beyond the Standard Model
 - EFT study
 - BSM models
 - ...

Topics of interest for WG1(2)

- Systematics of theory
 - Hadronisation
 - PDF
 - Missing higher-orders
 - HL-LHC, HE-LHC
 - ...

Recent Meetings of WG1 (1)

- WG1/WG2 joint meeting – Karlsruhe/August 17
 - <https://indico.cern.ch/event/652320/>
 - EFT talks/discussion
- Regular WG1 meeting - September 17
 - <https://indico.cern.ch/event/666051/>
 - EFT talks/discussion
- WG1 workshop – Amsterdam/November 17
 - <https://indico.cern.ch/event/673764/>
 - SM talks/discussion

Recent Meetings of WG1 (2)

- Regular WG1 meeting - January 18
 - Focus on EFT
 - Presentation of Workplan for the EFT studies
 - <https://indico.cern.ch/event/689683/>
- WG1 workshop – Milan/March 18
 - <https://indico.cern.ch/event/709162/>
 - EFT talks/discussion
- Regular WG1 meeting -September/October 18
 - To be determined

STSM

- One week in Nikhef (13-17 November 2017) for 8 people
 - Theoretical comparisons for SM VBS $W+W+$
- Milano-Bicocca:
 - Brivio (12 March - 6 April 2018)
 - Gomez-Ambrosio (25 March - 3 April 2018)
 - Rauch (19 March - 23 March 2018)
 - Recommendations for EFT implementation in data analysis

Done

- Networking
 - Several meetings and discussions
 - Over 50 people in WG1 email list
- Theoretical comparison for $W+W+$
 - Ballestrero et al., “Precise predictions for same-sign W -boson scattering at the LHC”, [1803.07943]
 - Under review in EPJC
 - Set standards for other signatures

On-going

- EFT study

→ Led by Brivio and Rauch → Talk by Rauch

→ Workplan already existing and statement of interests from few people → Still time to jump in!

→ Dedicated workshop happened in Milan

→ Deliverable: report with EFT studies and recommendations

→ Twiki:

<https://twiki.cern.ch/twiki/bin/view/VBSCan/VbsCanWG1>

On-going

- Study of polarisation for ZZ

→ Workplan:

<https://twiki.cern.ch/twiki/bin/view/VBSCan/SimPol>

→ Led by Ballestrero, Maina, Pelliccioli (Turin) and Charlot, Li (Paris) → Talk by Pelliccioli + Li

→ Workshop forseen:

- Laboratoire Leprince-Ringuet of the École Polytechnique (Paris)

- After summer but before the end of the year

→ Still time to jump in

On-going

- Study of VBS semi-leptonic signature
 - Talk by Grossi (in WG2 session)
 - Only starting → Still time to jump in
 - Some LO study would be interesting
 - Very complicated final state that mix all possible VBS signatures
 - Are on-shell, double-pole approximations good?

On-going

- Study of PDF for VBS
 - Talk by Novak
 - Only starting → Still time to jump in
 - What is the impact of PDF uncertainties on measurements?
 - Can VBS be used to study/constrain PDF?

To be done (or not)

- Comparison of theoretical predictions for other signatures (?)
- HL-LHC, HE-LHC (?)
- Hadronisation (?)
- Quark/gluon discrimination (?)
 - Talk by Siodmok
- ...
- Your idea(s)?

Program of the workshop for WG1

	Introduction	<i>Marco Zaro et al.</i>
	<i>Amphitheater of Central Library of Aristotle University of Thessaloniki, right in the middle of the campus, Thessaloniki</i>	10:30 - 10:40
11:00	Quark - gluon discrimination	<i>Andrzej Konrad Siadomok</i>
	<i>Amphitheater of Central Library of Aristotle University of Thessaloniki, right in the middle of the campus, Thessaloniki</i>	10:40 - 11:30
	EFT same-sign WW studies	<i>Michal Szleper</i>
	<i>Amphitheater of Central Library of Aristotle University of Thessaloniki, right in the middle of the campus, Thessaloniki</i>	11:30 - 12:00
12:00	EFT - comparison	<i>Michael Rauch</i>
	<i>Amphitheater of Central Library of Aristotle University of Thessaloniki, right in the middle of the campus, Thessaloniki</i>	12:00 - 12:30
	VBS polarisation - theory	<i>Giovanni Pelliccioli</i>
	<i>Amphitheater of Central Library of Aristotle University of Thessaloniki, right in the middle of the campus, Thessaloniki</i>	13:30 - 14:00
14:00	VBS polarisation - phenomenology	<i>Mr Ang Li et al.</i>
	<i>Amphitheater of Central Library of Aristotle University of Thessaloniki, right in the middle of the campus, Thessaloniki</i>	14:00 - 14:30
	PDF uncertainty for VBS	<i>Jakob Novak</i>
	<i>Amphitheater of Central Library of Aristotle University of Thessaloniki, right in the middle of the campus, Thessaloniki</i>	14:30 - 15:00
15:00	Discussion	
	<i>Amphitheater of Central Library of Aristotle University of Thessaloniki, right in the middle of the campus, Thessaloniki</i>	15:00 - 15:30

- Workshop meant to trigger discussion!

Conclusion

- Lots have been done ...
... but just a start
- Lots to be done

**If you are interesting in participating to anything,
please send us an email:**

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And

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... subscribe to :

<https://groups.google.com/forum/#!forum/vbscan-wg1>