



The
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VBSCan web site and school

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COST VBSCan

Second in-person meeting in the second grant period

CERN, 10 – 12 February 2019



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Challenge

The main goal of the VBSCan project is to investigate the Vector Boson Scattering (VBS) process and its implications for the Standard Model, by coordinating existing theoretical and experimental efforts in the area and by best exploiting hadron colliders data, thereby laying the groundwork for long-term studies of the subject and creating a solidly interconnected community of VBS experts.

Why?

Vector Boson Scattering processes are key for the understanding of the Standard Model of particle physics and involve the internal scattering of bosons. They have been measured in 2017 for the first time ever - exciting times for particle physicists exploring these new territories!

[Join us](#)

Upcoming events

- VBSCan@Ljubljana: Training Event, 12-15 February 2019, Ljubljana, Slovenia ([indico](#))
- VBSCan@Ljubljana: Second In-person Meeting in the Second Grant Period, 10-12 February 2019, Ljubljana, Slovenia ([indico](#))
- VBSCan combination and EFT interpretation meeting, 5-6 March 2019, CERN, Geneva, Switzerland ([indico](#))

Useful links

- [Twiki Pages](#)
- [GitLab](#)
- [Indico Meetings](#)

- ▶ We update the page regularly
- ▶ If you have any information please send it to us

School

- ▶ School director: **Senka Đurić**
- ▶ Main goals:
 - Organize the school in collaboration with ParticleFace COST
 - Theory oriented COST action
 - Two weeks school combining theory and experiment
 - End of winter / spring 2020
- ▶ Two locations for the final choice: **Budapest and DESY**
 - Two more in the earlier stage: Corfu and Benasque
- ▶ **DESY chosen as the final location**
 - Main argument: total prize about 30% lower
 - Dates: 2 - 14 March 2020
 - Organising committee: VBSCan + ParticleFace + DESY
- ▶ **School format**
 - Lectures (morning), hands-on tutorials (afternoon 1) and projects (afternoon 2)
 - One full and two half days free

School topics

- ▶ **Monte Carlo + Theory precision + systematics**
 - MC intro, merging+matching, EW corrections, fixed-order uncertainties, NNLO/NLO/LO, resummation (shower) uncertainties, hadronization (model+uncertainties), PDF uncertainties, TH uncertainties for measurements, ME (LO+NLO)
- ▶ **EFT**
 - existing models, comparison/translation between them, constructing EFT Lagrangian (power counting, equations of motion, Fierz, ...), renormalization and running couplings, collinear effective theory (SCET), heavy quark effective theory (HQET), EFT for dark matter, Higgs + EWK + top combined fitting
- ▶ **Fitting**
 - combine + morphing(?) + unfolding
- ▶ **Maximum likelihood**
 - ML tools, new use of ML: application to parameter estimates, applications to boosted jet identification, parton distribution functions
- ▶ **Jets reconstruction EXP+TH**
 - boosted jets and their content, q/g discrimination, applications to CJV, fwd jets-specific reconstruction, dynamic jet veto, PU, jet grooming (soft drop), theoretical insights and calculations related to these topics, IR limit, theoretical safety
- ▶ **Data interpretation**
 - pseudo-observables, full BSM models
- ▶ **Overview and prospects**
 - prospects and status of EWK measurements and theory
- ▶ **QC (quantum computing)**
 - QC advantages and possible applications in HEP