Working Group 4+5 Summary

Kristin Lohwasser
Ivica Puljak
Kadri Özdemir
Chara Petridou
Magdalena Slawinska

27-8-2021

Summary

2017-2021

- Kristin Lohwasser
- kristin.lohwasser@cern.ch
- Research Fellow at the University of Sheffield
- ATLASA member since 2005
- Research interest: Effective field theory constraints, VBS+diboson production

2017-2021

- Ivica Puljak
- puljak@fesb.hr
- Professor of Physics at University of Split, Faculty of electrical engineering, mechanical engineering and naval architecture (FESB)
- CMS member
- **Mayor of the City of Split since June 2021**

Summary

WG5 leaders:

- Magdalena Sławińska
- magdalena.slawinska@cern.ch
- Assistant Professor at IFJ PAN (Kraków, Poland)
- ATLAS member since 2013
- research interests: Higgs couplings to polarised W bosons, di-Higgs phenomenology
- convenership activities (LHCHXSWG HH group), supervision of students

2017-2019

- Chara Petridou
- chariclia.petridou@cern.ch
- Professor in Particle Physics at AUTh (Aristotle University of Thessaloniki, Greece)
- Team leader of the Thessaloniki ATLAS group (since 1995 an ATLAS Institute)
- Research interests: Indirect searches for New Physics, Vector Boson Scattering, Higgs couplings to bosons
- Active in WZ and ZZ analyses
- Supervision of MSc and PhD students

2017-2021

2

- Kadri Özdemir
- kadri.ozdemir@cern.ch
- Assoc. Professor at Piri Reis University, Engineering Faculty, Istanbul (TR)
- CMS member since 2008
- Research interests: BDT and DNN techniques in VBF/VBS analyses

2019-2021

WG4: Outreach and Meetings

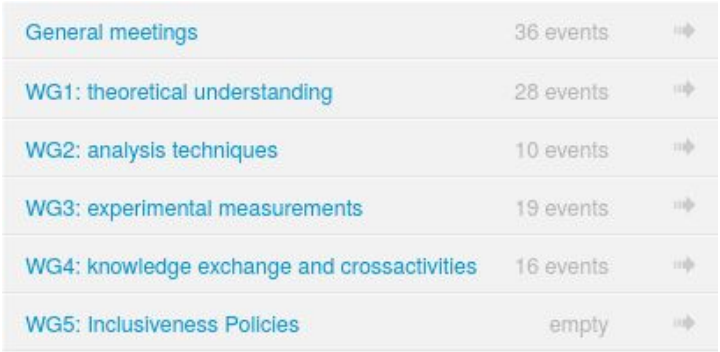
- From the Memorandum of Understanding of our VBSCan COST action

WG4: knowledge exchange and cross-activities		
Main aim	Knowledge transfer as exchange of expertise, scientific tools and achievements, human resources and experience, spreading the VBS community with new ideas and unconventional thinking.	
Tasks & Deliverables	• Organisation of the internal events, STSM coordination • Implementation of the communication tools (website, mailing lists, wiki-based documentation collector, directory of VBS experts) • Outreach • Final Handbook publication • Final Conference organisation	✓ ✓ ✓ *To do* ✓
Milestones	• Full website delivery infrastructure, including jobs offers and candidates database, within 6 months • Events organisation and STSM handling well synchronised with the events schedule	✓ ✓

STSM – Short term scientific missions
→ note: this has been somewhat muddled with WG5

WG4: Internal events

- https://indico.cern.ch/category/9081/



General meetings
→ included organisation meeting
Lot's of topical meetings, arranged by local committees

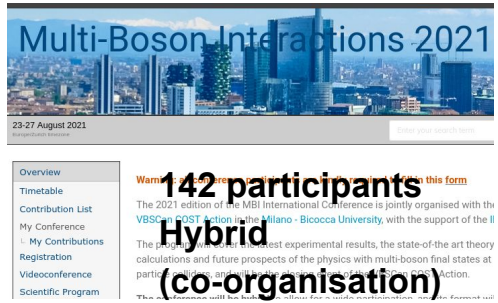
Topical Meetings	4	
Annual Meetings	6	(incl. Kick-Off and MBI)
Mid-term meetings	2	
Schools	3	+1 training event
General Organisation	6	(school, WG selection comm.)
Core group	9	
Management committee	5	

Working group meetings are organised by WG leaders (no participant information)

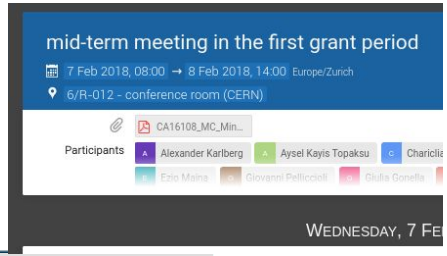
WG4 meetings: includes also school organisation and similar meetings

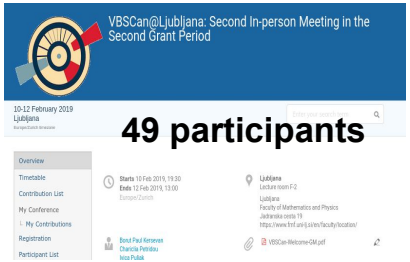
WG5: included in WG4 or via email

WG4: General meetings

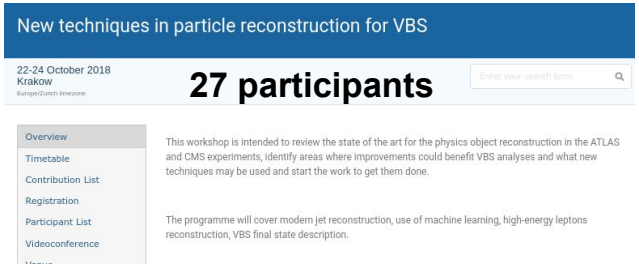


8 general meetings/workshops with in total more than 500 participants
Generally organised together with local organising committee





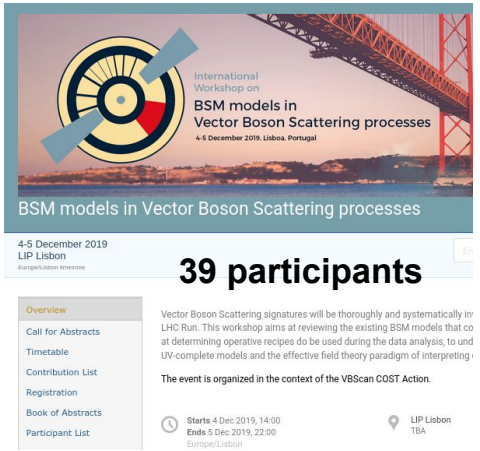
WG4: Topical meetings

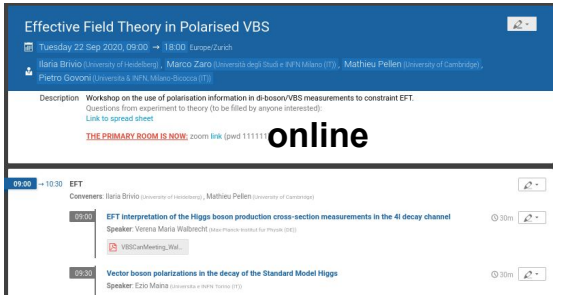


4 topical meetings with more than 100 participants

Suggested by working leaders (W1-W3) for topical in-person discussions in collaboration with local committees

Some support from VBScan





WG4: Schools

70 participants

- **3 training schools + 1 training events**
- **Over 200 students / participants**
- PREFIT school in collaboration with another COST action
- Training event together with in-person meeting

Training on Effective field theory, QCD, SMEFT at NLO: Higgs, EWK and Top, Machine Learning, Jet reconstruction, Fitting, Quantum Computing
-- with hands-on exercises

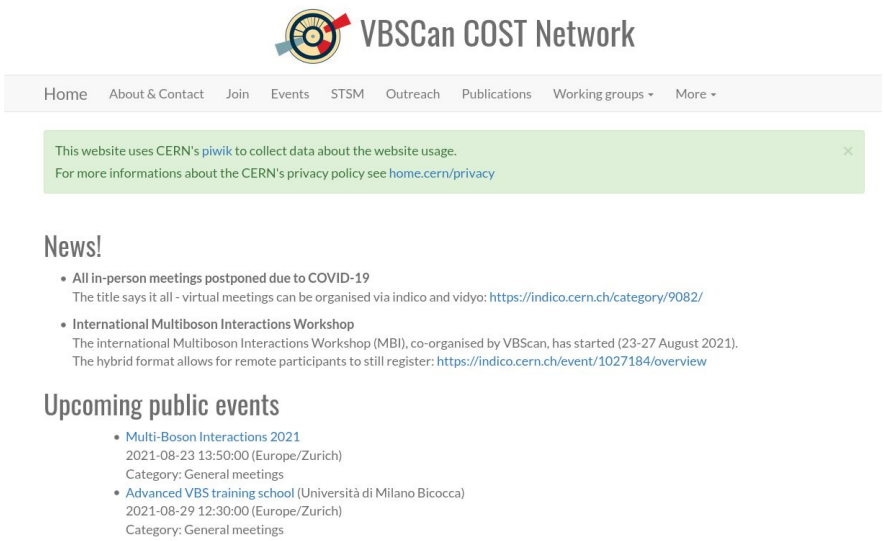
80 participants

31 participants

29 participants

WG4: Webpage and Communication

- Website and communication



General use of CERN tools (twiki, indico) in combination with website (that dynamically reads some twiki/indico information).
Problematic points:

- Relatively few updates (2x per year in contract)
- For future: might be better to hire someone to also create content of website (videos, text, social media, …)
- Website will stay for future: Should plan for one final update
  (any input you'd like → forward to WG4)

WG4: Publications

https://vbscanaction.web.cern.ch/publications.html

1. Non-INSPIRE

Ordered in:

1. Non-INSPIRE listed reports (13 reports)
2. Experimental publications (12 reports → should be extended, please report!)
3. INSPIRE-listed reports (27 reports)

1+3 are overlapping in that most of those use VBSCAN-PUB report numbers (46 in total)

Preprints, proceedings and publications not on inspire

- **VBSCan Mid-Term Scientific Meeting** -- Baglio et al., https://arxiv.org/abs/2004.00726 , VBSCAN-PUB-02-20
- **Developing Careers in Physics Perspectives of Particle Physics Researchers from the VBScan network at various stages of their careers** -- Kristin Lohwasser, https://arxiv.org/abs/2001.00988 , VBSCAN-PUB-10-19
- **Automated Predictions for Polarized Parton Scattering** -- Diogo Buarque Franzosi, Olivier Mattelaer, Richard Ruiz and Sujay Shil, http://arxiv.org/abs/arXiv:1912.01725, Published in J. High Energ. Phys. 2020, 82 (2020), VBSCAN-PUB-09-19
- **VBSCan Thessaloniki 2018 Workshop Summary** , VBSCan network, https://arxiv.org/abs/1906.11332 , VBSCAN-PUB-05-19
- **Same-sign WW Scattering in the HEFT: Discoverability vs. EFT Validity** -- P. Kozow, L. Merlo, S. Pokorski, M. Szleper, https://arxiv.org/abs/1905.03354 , JHEP 1907 (2019) 021, VBSCAN-PUB-03-19
- **QCD and electroweak corrections to WZ scattering at the LHC** -- Ansgar Denner, Stefan Dittmaier, Philipp Maierhöfer, Mathieu Pellen, Christopher Schwan. https://arxiv.org/abs/1904.00882 , Published in: JHEP 06 (2019) 067, VBSCAN-PUB-02-19
- **Polarization Fraction Measurement in same sign WW scattering using Deep Learning** -- Junho Lee, Nicolas Chanon, Andrew Levin, Jing Li, Meng Lu, Qiang Li, and Yajun Mao, http://arxiv.org/abs/arXiv:1812.07591
- **The CLIC Potential for New Physics** -- J. de Blas et al., CERN-TH-2018-267 (2018), http://arxiv.org/abs/arXiv:1812.02093
- **Anomalous quartic gauge couplings and unitarization for the vector boson scattering process pp->W+W+jj X -> l+ν l+ν jj X** -- G.Perez, M. Sekulla and D. Zeppenfeld, Eur. Phys. J. C 78 (2018) no.9, http://arxiv.org/abs/arXiv:1807.02707
- **Same-sign WW scattering at the LHC: can we discover BSM effects before discovering new states?** -- Jan Kalinowski, Paweł Kozów, Stefan Pokorski, Janusz Rosiek, Michał Szleper, Sławomir Tkaczyk, Eur. Phys. J. C 78 (2018) 403, http://arxiv.org/abs/arXiv:1802.02366
- **VBSCan Split 2017 Workshop Summary** -- Anders, Christoph Falk and others, 2018, VBSCAN-PUB-01-17, https://arxiv.org/abs/1801.04203
- **Resonant production of Wh and Zh at the LHC** -- Antonio Dobado, Felipe J. Llanes-Estrada and Sanz-Cillero, Juan J., J. High Energ. Phys. (2018) 2018: 159., https://arxiv.org/abs/1711.10310
- **Collider production of electroweak resonances from γγ states**-- Rafael L. Delgado, Antonio Dobado, Miguel Espada, Felipe J. Llanes-Estrada, Ivan Leon Merino, JHEP 1811 (2018) 010, https://arxiv.org/abs/1710.07548

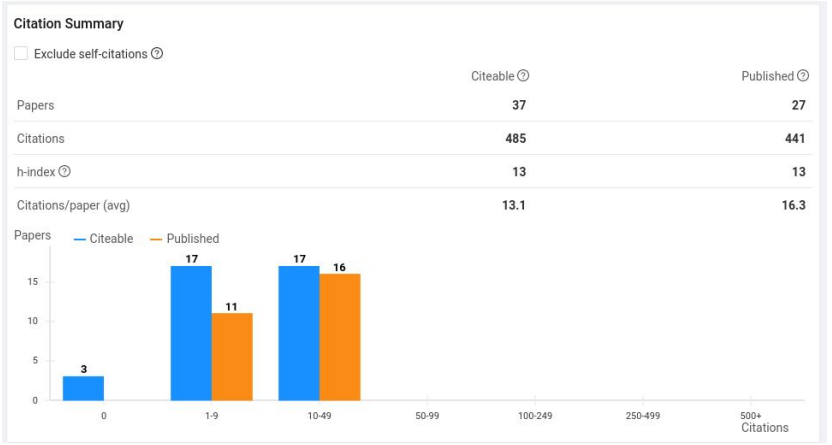
WG4: Publications: INSPIRE

https://vbscanaction.web.cern.ch/publications.html

Preprints

- Beyond the Standard Model in Vector Boson Scattering Signatures https://inspirehep.net/literature/1797078
- Vector boson fusion at multi-TeV muon colliders https://inspirehep.net/literature/1797226
- VBSCan Mid-Term Scientific Meeting https://inspirehep.net/literature/1789399
- Parton-shower effects in Higgs production via Vector-Boson Fusion https://inspirehep.net/literature/1788584
- Doubly Charged Higgs Boson Production at Hadron Colliders https://inspirehep.net/literature/1771850
- Automated predictions from polarized matrix elements https://inspirehep.net/literature/1768399
- Exploring the scattering of vector bosons at LHCb https://inspirehep.net/literature/1750027
- Dynamical vector resonances from the EChL in VBS at the LHC: the WW case https://inspirehep.net/literature/1746619
- Polarized vector boson scattering in the fully leptonic WZ and ZZ channels at the LHC https://inspirehep.net/literature/1743206
- VBSCan Thessaloniki 2018 Workshop Summary https://inspirehep.net/literature/1741953
- EFT triangles in the same-sign WW scattering process at the HL-LHC and HE-LHC https://inspirehep.net/literature/1741437
- An event generator for same-sign W-boson scattering at the LHC including electroweak corrections https://inspirehep.net/literature/1738518
- QCD and electroweak corrections to WZ scattering at the LHC https://inspirehep.net/literature/1727600
- Sleptons without Hadrons https://inspirehep.net/literature/1717484
- Heavy neutrinos with dynamic jet vetoes: multilepton searches at √s=14 , 27, and 100 TeV https://inspirehep.net/literature/1710387
- Polarization fraction measurement in same-sign WW scattering using deep learning https://inspirehep.net/literature/1710010
- Heavy resonances and the electroweak effective theory https://inspirehep.net/literature/1705201
- Collider phenomenology of vector resonances in WZ scattering processes https://inspirehep.net/literature/1704513
- Colorful Imprints of Heavy States in the Electroweak Effective Theory https://inspirehep.net/literature/1700399
- Studies of Dimension-Six EFT effects in Vector Boson Scattering https://inspirehep.net/literature/1693669
- Vector Boson Scattering Studies in CMS: The pp => ZZjj Channel https://inspirehep.net/literature/1683843
- Transversal Modes and Higgs Bosons in Electroweak Vector-Boson Scattering at the LHC https://inspirehep.net/literature/1681276
- Precise predictions for same-sign W-boson scattering at the LHC https://inspirehep.net/literature/1663469
- Stress testing the vector-boson-fusion approximation in multijet final states https://inspirehep.net/literature/1657798
- Vector boson scattering: Recent experimental and theory developments https://inspirehep.net/literature/1647952
- Resonant production of Wh and Zh at the LHC https://inspirehep.net/literature/1639286
- W boson polarization in vector boson scattering at the LHC https://inspirehep.net/literature/1632481

3. INSPIRE-listed reports with VBSCan-PUB number



WG4: Publications: todo

16	Action Handbook: collection of the publications and materials produced by the working groups into a single coherent report	ongoing	For each yearly workshop, VBSCan collects the status of the activities in a report that is then published on Open journals. The fist report is published (arXiv:1801.04203), while the second one is being submitted. The final collection of all the Action papers will happen at a later stage.

Have published a number of review articles based on our meetings

The final handbook is prepared as a list of references within a small summary, in a twiki/on the webpage

WG4: Career Database

Collection of Particle physics jobs linked from VBScan Webpage: https://twiki.cern.ch/twiki/bin/view/VBSCan/VBSCanJobs

Short survey of researchers

- General attitude towards Physics
- Inspiration: Why physics
- Change throughout the year
- Careers in Physics
- Career advice

Submitted to archive (ed-ph)http://arxiv.org/abs/2001.00988

Developing Careers in Physics – Perspectives of Particle Physics Researchers from the VBScan network at various stages of their careers
VBSCAN-PUB-09-19

Kristin Lohwasser[1]
[1]Department of Physics and Astronomy, Sheffield University, Sheffield, UK

Abstract
Outlooks of particle physics researchers on their careers and the general challenges in establishing their careers over different career stages are surveyed using a questionnaire distributed to participants in an ERC-funded research network, "VBScan". The respondents displayed a great deal of insight into what is needed for a career in academia, or ore specifically particle physics, though they also did not downplay the element of "luck". Some notable differences between career levels could be observed in problems raised and attitudes towards careers.

WG4: Career Database

Follow-up of Career Database: Professionals that have left physics

13 people replied on the work part (what's your work like, how is it different)
→ 10 are happy to be contacted

2 replied on the "old" physics-style

- 7 working in DE, 3 in GE, 1 IT, 1 in (Netherlands, France, Austria, Germany)
- Nice to get more examples from all around Europe (very Germany and probably experiment centered)

→ Would still appreciated more replies / advertisement!

Dear all,
we would like to create a database for a jobs outside academia, but concentrating more on the actual job content for people to be able to see what one does on a one-to-one basis. This is in order to show people real-life experiences from a wide range of people who have left particle physics.

In order to create this database or **summary of experience, we have created a survey (first link below [1])** and we would be grateful if you could fill it (anonymity is fully ok! It is really about the job experience in itself).On a second note, we would like to conduct a **survey on career, attitudes and feelings towards physics as well as career prospects inside and outside of academia [2].** The 'inside' job has already been done (see https://arxiv.org/abs/2001.00988). If you'd happy to contribute to this project too, please also answer the survey in the second link.
Best (VBScan network)
==========Job database
[1]https://docs.google.com/forms/d/1ucO7-_y_IiQerF3Hms8JEuX_gSZN1vPqr1r7P2SV0mEw/edit?usp=sharing
==========old career form
[2]https://docs.google.com/forms/d/1fngBBpoZkpxkt86-ykJXE7jr53DC5gpiZ8eGO_v1bUY/edit?usp=sharing

WG4: Outreach

Outreach generally organised as session during in-person meetings
→ in Pub/Cafe, talks/structured discussion followed by informally "mingling"

- Split, Krakow, Thessaloniki, Istanbul, Helsinki, Ljubljana
- Over 200 participants in total
- Informal discussions allow one-to-one conversations

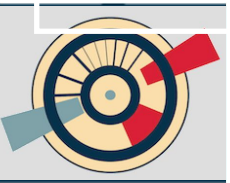
Summarized on webpage:
https://vbscanaction.web.cern.ch/outreach-general-public.html

General problems: Local efforts (masterclasses, other outreach) already take up quite a lot of time → so events during Meetings are best/efficient solution, gives indeed also a meeting place for networking

WG4: General conclusions

- Generally successful completion of action
  - Few things were re-organised and worked efficiently: Local organising committees + school committee, WG5 taking over STSM coordination (better work balance)

- A few points, that did not go very well (→ meant to help for future COSTs)
  - Slightly difficult task (database of jobs) → be careful what you promise
  - Initial idea was to get "simple summaries" of STSMs and publish on website → was not always followed up properly (different people responsible for different parts of the process) and dropped after a while
  - Website: Add social media and request for someone proactive
  - Should probably have more regular management meetings



WG4+WG5:
Short Term Scientific Missions (STSMs)

VBSCAN greatly encouraged STSMs during the four year period of the action

The STSM officers:

2017-2019

2019-202

STSM Selection Committee: STSM officer + WG4 & WG5 leaders +
VBSCan Action chair +
an elected representative of the MC

WG4+WG5:
Short Term Scientific Missions (STSMs)

Summary of STSMs 2017- 2021

STSMs completed until August 2021	
Number of STSMs	38
Number of ECIs funded	12
Number of researchers from ITCs	9
Number of female researchers	14
Total grant amount awarded	57614.7 euro
Total number of days	411

WG4+WG5:
Short Term Scientific Missions (STSMs)

STSM Topics

1. MC Comparisions:WG1 13-17.11.2017 from Oxford to Nikhef, Amsterdam
2. MC Comparisions:WG1 13-17.11.2017 from DESY to Nikhef, Amsterdam (x2 persons)
3. MC Comparisions:WG1 13-17.11.2017 from Karlsruhe to Nikhef, Amsterdam
4. MC Comparisions:WG1 13-17.11.2017 from Cambridge to Nikhef, Amsterdam
5. MC Comparisions:WG1 13-17.11.2017 from Freiburg to Nikhef, Amsterdam
6. MC Comparisions:WG1 13-17.11.2017 from Torino to Nikhef, Amsterdam
7. MC Comparisions:WG1 12-17.11.2017 from Pavia to Nikhef, Amsterdam
8. Preparation of the Run2 WZ fully leptonic analysis 19.11-14.12.2018 from Dresden to Thessoloniki
9. Preparation of the Run2 WZ fully leptonic analysis 26.11-2.12.2018 from Dresden to Thessoloniki
10. EFT in action:extracting EFT constraints from actual data analyses 12.03-06.04.2018 from Copenhagen to Milano
11. Preparing framework for statistical analysis in the measurement of the Higgs boson couplings to longitudinally and transversally polarised W bosons 21-26.01.2018 from Krakow to CERN, Geneva, Switzerland
12. Higgs couplings to polarized W bosons in VBF: a framework for statistical analysis 15.01-15.02.2018 from Amsterdam to CERN, Geneva, Switzerland
13. EFT Comparison in VBF 25-30.03.2018 from Karlsruhe to Milan.
14. Study of statistical procedure of extracting WZ VBS cross sections through a fit and use this information further to extract aQGCs and contribute to the combination of the ATLAS and CMS 25-30.03.2018 from Thessaloniki to ITKP, Dresden

WG4+WG5:
Short Term Scientific Missions (STSMs)

STSM Topics

15. Implementation and Investigation of EFT Models 12.03-06.04.18 from Durham to Milano, Italy
16. Study on separating Higgs couplings to longitudinally and transversally polarised W bosons, implementation of statistical procedure 12-27.04.2018 from Amsterdam to CERN, Geneva, Switzerland
17. Studies on the extracting longitudinal polarization through angular distributions 5-10.08.2018 from Pavia to Ljubljana, Slovenia
18. Study of kinematics of the jets in VBS processes 20-29.09.2018 from İstanbul to Sheffield, UK
19. W boson reconstruction with neural network 03.12-08.12.2018 from Ljubljana to Pavia
20. VBS analysis in the CMS experiment 20.02-6.03.2019 from Milano to CERN
21. Improvement and refinement of tools towards the computation and precise description of vector-boson scattering at the LHC 6-12.01.2019 from Wuerzburg to Cambridge
22. Global fit on the parameters of Dimension-6 or Dimension-8 operators of the SM Effective Field Theory(I) 18.02-06.03.2019 from Thessaloniki to CERN
23. Global fit on the parameters of Dimension-6 or Dimension-8 operators of the SM Effective Field Theory(II) 13.02-22.02.2019 from Thessaloniki to CERN
24. Global fit on the parameters of Dimension-6 or Dimension-8 operators of the SM Effective Field Theory(III) 13.02-27.02.2019 from Thessaloniki to CERN
25. Electroweak corrections for VBS at the LHC 18.03-22.03.2019 from Cambridge to Wuerzburg

STSM Topics

26. VBS studies using same-sign WW events using full Run-II LHC data 25.02-14.03.2019 from Budapest to Antwerp
27. Color Evolution in VBS/VBF 25.03-14.04.2019 from Karlsruhe to Vienna
28. BDT and DNN multivariate analysis techniques for VBF jets 30.03-07.04.2019 from Istanbul to Helsinki
29. Rapidity-dependent, Dynamic Jet Vetoes in VBS Searches for Type II Seesaw Scalars 03.04-14.04.2019 from Louvain-la-Neuve to Ljubljana
30. Comparing the SMEFT and eCHL in the context of VBS experimental analyses 25.05-10.06.2019 from Durham to Madrid
31. VBS ZZ to 4l with CMS 24.07-05.08.2019 from Split to Palaiseau
32. New techniques in VBS study part 2 18.08-23.08.2019 from Pavia to Zurich
33. Run 2 Analysis Collaboration of Ioannis Karkanias with ATLAS group of LAPP Annecy 09.11-09.12.2019 from Thessaloniki to Annecy
34. Advance Techniques to Maximize the Information Content of Multivariate and Multiparameter Estimation in the Framework of SMEFT Approach (I) 06-13.02.2020 from Thessaloniki to Sheffield
35. Advance Techniques to Maximize the Information Content of Multivariate and Multiparameter Estimation in the Framework of SMEFT Approach (II) 06-13.02.2020 from Thessaloniki to Sheffield
36. Extensions of the Same-Sign WW VBS analysis 15-29.02.2020 from Milano to CERN
37. New techniques in VBS study part 3 29.03-05.04.2020 from Pavia to Zurich

WG5: Inclusiveness policies

- From the Memorandum of Understanding of our VBSCan COST action

WG5: Inclusiveness Policies		
Main aim	Full inclusion of researchers that, for geographical or sociological reasons, might need specific policies to get on the same footing as the rest of the community.	
Tasks & Deliverables	● ECI promotion through STSM and as managers of the Action ● counteract gender imbalances, also promoting women in manager positions ● support members of COST ITC through STSM and organisation of events there	✓ ✓ ✓
Milestones	● Review of the effectiveness of inclusion policies every six months ● organisation of topic discussions on inclusiveness issues during the yearly meetings, the MTSM and the final conference	✓ ✓

ECI – Early Career Investigator
ITC – Inclusiveness Targeted Countries
MTSM – Mid-term Scientific Meeting

WG5: Inclusiveness policies (II)

Ensured Inclusiveness Policies in terms of Inclusiveness Targeted Countries (ITCs), age and gender are applied:

- In the Management Committee (MC)
- In the Core Group
- In the approved Short Term Scientific Missions (STSMs)
- In the leadership roles within VBSCan (e.g. in activities like: paper editing, organizing committees of Schools, Annual meetings and Training activities, search committees etc)
- In the supports given for attending the training schools
- In the selection of the lecturers at the training schools
- In the participation/organization of the outreach events

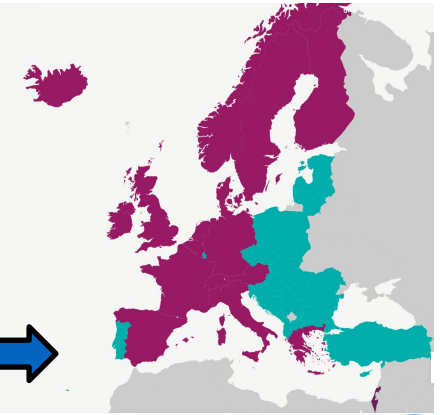
WG5: Inclusiveness policies (III)

VBSCAN Geographical Inclusiveness:

Initially, in 2017, 18 COST Member Countries were participating in the action
Today, 2021:

- 24/39 COST Members + Cooperating Member □ 61.5%
- 9/24 are considered as Inclusiveness Targeted Countries (ITCs) □ 37.5%
- 1 Near Neighbour Country (NNC) □ Morocco and
- 3 International Partner Countries (IPC) □ Brazil, China (2 Institutes), USA

COST Members/Cooperating Member:
Albania, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, North Macedonia, Malta, Moldova, Montenegro, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom; and Israel (Cooperating Member).



ITC: Albania, Bosnia and Herzegovina, Bulgaria, **Cyprus, Czech Republic**, Estonia, **Croatia**, **Hungary**, Lithuania, Latvia, Luxembourg, Malta, Moldov Montenegro, **Poland**, **Portugal**, Romania, **Slovenia**, Slovakia, Republic of North Macedonia, Republic of **Serbia** and **Turkey**

WG5: Achievements on Inclusiveness

1. ITC

- Achieved since 2017 : - 5 more ITC countries joined the Action (Cyprus, Hungary, Portugal, Serbia, Turkey)
  - 10/34 participants to the 1st training school, from ITC countries
  - 9 of the 2nd school from ITC countries
  - 9/38 STSM researchers from ITC countries

The MC always allocates funds for ITC members to participate at conferences and encourages STSM applications from these countries.

Comment: The inclusion of ITCs is a challenging objective small number of researchers from ITCs in our field. (CERN Lab Users from Bosnia & Herzegovina, Latvia, Luxembourg, Malta, Montenegro, Northern Macedonia is less than 10 in each !)

WG5: Achievements on Inclusiveness (II)

1. Summary Table on ITC

- Achieved: Increase on Participating countries, MC members, Leadership roles
- Comparison to all COST actions

	Participating countries %ITC	MC Members %ITC	Leadership roles %ITC	Rel. represent. of ITC in leadership roles
Action CA16108	37.5%	32.3%	22.2%	59.2%
All Actions	48%	46%	24%	52%

- The ITC partners are strongly encouraged to
  - get involved in the activity of their interest within the Action,
  - profit from STSM to strengthen their contribution,
  - profit from available conference grants to present at conferences,
  - promote their ECIs to take a leading role in the Action.

WG5: Achievements on Inclusiveness (III)

2. Leadership positions given to ECIs

- Achieved: - 3/5 WG leaders are ECIs
  - 30-40% of the Core group are ECIs
  - 12/38 STSMs awarded to ECIs

- *Comment: The Action sponsored the publication of obtained results in open-access journals, which enriches the ECI's CV.*

	MC Members %ECI	Leadership roles %ECI	Rel. represent. Of ECIs in leadership roles
Action CA16108	14.7%	30%	204%
All Actions	29%	10%	34%

WG5: Achievements on Inclusiveness (IV)

3. On gender representation

- Achieved: - 3/5 WG leaders are women
  - Out of 38 STSMs 14 realized by women
  - About 30% of the trainees in the 1st school were women (number higher than the average population in the field).

- *Comment: The female involvement in our VBSCan activity is higher than the world average in our field (represented by CERN)*

	MC Members %Females	Leadership roles %Females	Rel. represent. Of Females in leadership roles
Action CA16108	23.5%	44.4%	189%
All Actions	40%	14%	35%

WG5: General conclusions

- Generally successful completion of the Action. The goals of the WG5 were mostly achieved
  - On inclusiveness VBSCAN did well over the average in all COST Actions concerning ECI's and gender balance.
  - By assigning the STSMs coordination to WG5 the workload was better balanced between WG4 and WG5
- A few points, that did not go very well (→ meant to help for future COSTs)
  - A stronger involvement in the school organization and realization (sharing the workload with WG4)
  - More effort to include in the Action a couple more ITC countries which are active in the field.