

Summary of BSM group activities

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ILD phone meeting, 8 Mar 2017



Ongoing analyses

- 1 Higgsinos (J. Yan, T. Tanabe, & al.)
- 2 Parameter extraction from results of (1) (S-L Lehtinen, H. Baer & al.)
- 3 STC4 (M.B., S. Caizza)
- 4 WIMPs (M. Habermehl, T. Tanabe & al.)
- 5 SUSY “Point 5” (M. Chera)
- 6 FCNC in top (F. Zarnechi)
- 7 $H \rightarrow 3$ extra light scalars (A. Helmboldt (Heidelberg)):

In red: Talks today - In blue: Talks next BSM-focus meeting.

- New topics are welcome! Some ideas:
 - Dark-sector WIMPs decaying in the detector.
 - Lighter-than-125 Higgs(like) states, eg. nMSSM singlet.
 - Direct signs of extra dimensions.

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Status

- 1 Higgsinos: [Paper](#) in preparation.
 - Needs more SGV statistics of strongly pre-selected $\gamma\gamma$ and $e\gamma$.
 - In the making.
- 2 Parameter extraction from results of (1): As above + Suvi's [thesis](#) in preparation.
- 3 STC4: M.B. [Published](#) in ILC-LHC combined STC paper, further developments presented at ICHEP & LCWS. S. Caizza: [Thesis](#) almost ready.
- 4 WIMPs : [Thesis](#) in preparation. Request for samples presented today.
- 5 SUSY "Point 5" : [Thesis](#) nearing completion.
- 6 FCNC in top: [Starting](#), but already done for CLICdb @ 380 GeV. Will need samples.
- 7 $H \rightarrow 3$ extra light scalars: [New topic](#), just starting, right now on pure theory level.

Support report to the ICFA answer to MEXT

Reminder: Outline the capabilities of ILC for discovery of new particles if LHC sees

- 1 no new physics, OR
- 2 relatively light new physics, OR
- 3 new physics beyond direct ILC reach.

The answer, as we all already know, is that it doesn't matter what LHC sees.

However, the **emphasis** between direct observation (the topic of the ILD-BSM group), and indirect observation (The topic of the Higgs and Top/EW groups) **changes**.

The report is now on the arXiv: [arXiv:1702.05333](https://arxiv.org/abs/1702.05333).

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NOTE

- This report clearly is about the capabilities of a 500 GeV ILC!
- Staging is *not* considered.
- See Jackie's talk for some points on BSM+staging!

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Organisational

- Conveners: M.B. (mikael.berggren@desy.de) and Jacqueline Yan (jackie@post.kek.jp).
- Mailing list:
 - Send mail to sympa@desy.de with "SUBSCRIBE ild-physics-bsm *firstname lastname*" as subject.
 - Wait for an OK from the maintainers (M.B. and Jackie).
 - This list is for people *active* in BSM analyses in ILD (and their supervisors).
- Request to give talks to ild-physics-conveners@desy.de.
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The BSM working-group meetings

- In the regular BSM working-group phone meetings more detailed discussions can take place.
- Suggest: Every 4 (or 6) weeks. If every 6 weeks, it would always be the week before the BSM-focus Analysis meeting. (Not yet decided)
- First meeting last week, with a Q&A about all analyses.
- Future meetings should be more focused on actual analysis.
 - Technical issues that every one will or might profit from.
 - Problems encountered: Any new ideas?
 - Ideas for new analyses, and putting the studies in a more global context.
 - The place to get feed-back on preliminary results, and give progress reports.
 - Not obligatory to present in *every* meeting.
 - But *not* full analysis reports: Those should go into the BSM -focus Ana/opt meetings.

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Questions to the first BSM working-group meeting

- 1 The physics of your analysis
- 2 Current status of the analysis: starting – on-going – close to final ?
- 3 Level of ambition of the analysis
 - Pure theory
 - Simple 4-vector smearing
 - Advanced 4-vector smearing (Delphes-level)
 - Fastsim (SGV)
 - Fullsim
- 4 Requests for samples: signal/background
- 5 LHC connection:
 - Not yet seen, but will be before ILC starts
 - Might be seen after the full HiLumi LHC
 - No way LHC would see it.
 - etc
- 6 Any interest for ILC@250, or is ≥ 500 mandatory ?

(See the [ilcagenda page](#) for the detailed responses)