Toponium discussion 14th of Jan.

A few questions:

- Are we able to compile a set of well-defined predictions (LO, NLO, NNLO, res, GF, NRQCD) for the enhancement at threshold at the level of cross section and spin-correlations, differential in m(tt)?

- Should we establish a baseline together with experimentalists with respect to which we provide predictions for the threshold enhancement?

  Proposal:
  - Use POWHEG at NLO (fixed order) with the decays at the parton level (all parameters stated, samples and some plots made available).
  - Each TH collaboration will know what is being double counted with the NLO fixed order and can extract an “add-on prediction”.
  - Compare locally and in exp-like bins
  - Compare TOPIXS with Paolo et al. predictions: what is relative importance of the bound states with respect to the continuum enhancements?

- What are the theoretical developments that are needed to bring pp predictions to the level needed at ee collisions?

  - Provide theory predictions with uncertainties
  - Effort to improve the (P)NRQCD predictions towards NNLO

- Experimental efforts:

  - ATLAS: Identify the origin of the model dependence of the measured enhancement
  - What can be done to try to improve the m(tt) resolution?
  - What are the prospects of using other final states?
  - Are there observables other than mtt/spin correlations? Quantum observables?

- New Physics:

  - Is there room for new physics? In case, which one? How does a BSM resonance differ from the SM expected signal