

Spin Studies Update

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Since Last Presentations

- Major code rewrite
 - Allow implementation of the CiC based analysis (like fabrice)
 - Allow use of external configuration files (which allows submitting to batch with different parameters)
- Created bin optimization code.

Last week

- Working on implementation of CiC based analysis (being done)
- Fixing bug with simultaneous fit. (done)
- Moving to Moriond dataset.

Analysis Flow

- Start from the categorization of the *Mass Factorized* Analysis taking categories 0 to 3
- Split events on those categories into $\cos(\theta^*)$ bins.
- Produce dataset over new categories (4×2) from data and MC signal samples
- Create and fit Signal Model ($3 \times$ Gaussian) to MC signal SM
- Fit same model to Alternative Model (Spin 2)
- Fit background Model to data sideband and extrapolate yield at signal region
- Compute separation from previous values (to be done)
- Fix all parameters on all the categories of Signal Model
- Fit Signal Model (floating signal strength μ) + Background Model to data.

Details

- Signal area 2% around 125 GeV.

To be done:

- Normalization of Alternative Model (Spin 2) to SM Model total number of events.
- Pass event Yields to separation code

Analysis Flow

- Start from the categorization of the *Cut Based* Analysis taking categories 0 to 3
- Split events on those categories into 5 $\cos(\theta^*)$ bins (0.2 spacing).
- Produce dataset over new categories (4×5) from data and MC signal samples
- Create and fit Signal Model ($3 \times$ Gaussian) to MC signal SM
- Create efficiency function to flat out $\cos(\theta^*)$ for SM
- Fit Signal Model to Alternative Sample (Spin 2) and apply efficiency correction (to be done)
- Fit background Model to data sideband and extrapolate yield at signal region
- Compute separation from previous values (to be done)
- Fix all parameters on all the categories of Signal Model (to be done)
- Fit Signal Model (floating signal strength μ) + Background Model to data. (to be done)

Details

- Signal area 2% around 125 GeV.

To be done:

- Normalization of Alternative Model (Spin 2) to SM Model total number of events.
- Pass event Yields to separation code

Summary:

Last week

- Stuck for a long time solving simultaneous fit problem, fixed late yesterday.
- Moved to Moriond ntuples.
- Finishing implementation of the CiC analysis.

Next:

- Finish the CiC Analysis implementation
- Pass values from both analysis to Matt's code for separation
- Run boundary optimization code.
- Redo analysis with new boundaries

