

Fast emulation of track reconstruction in simulation

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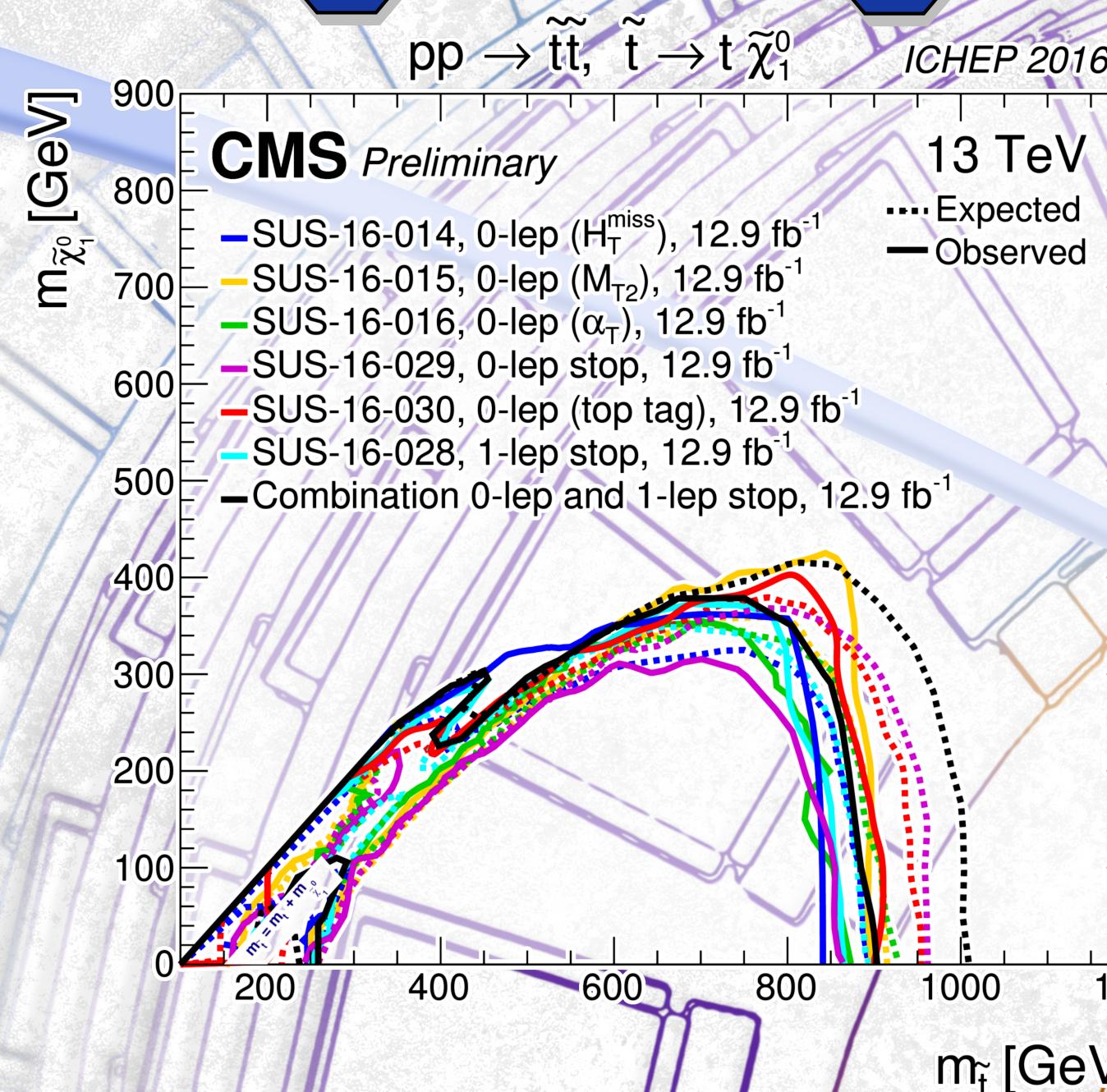
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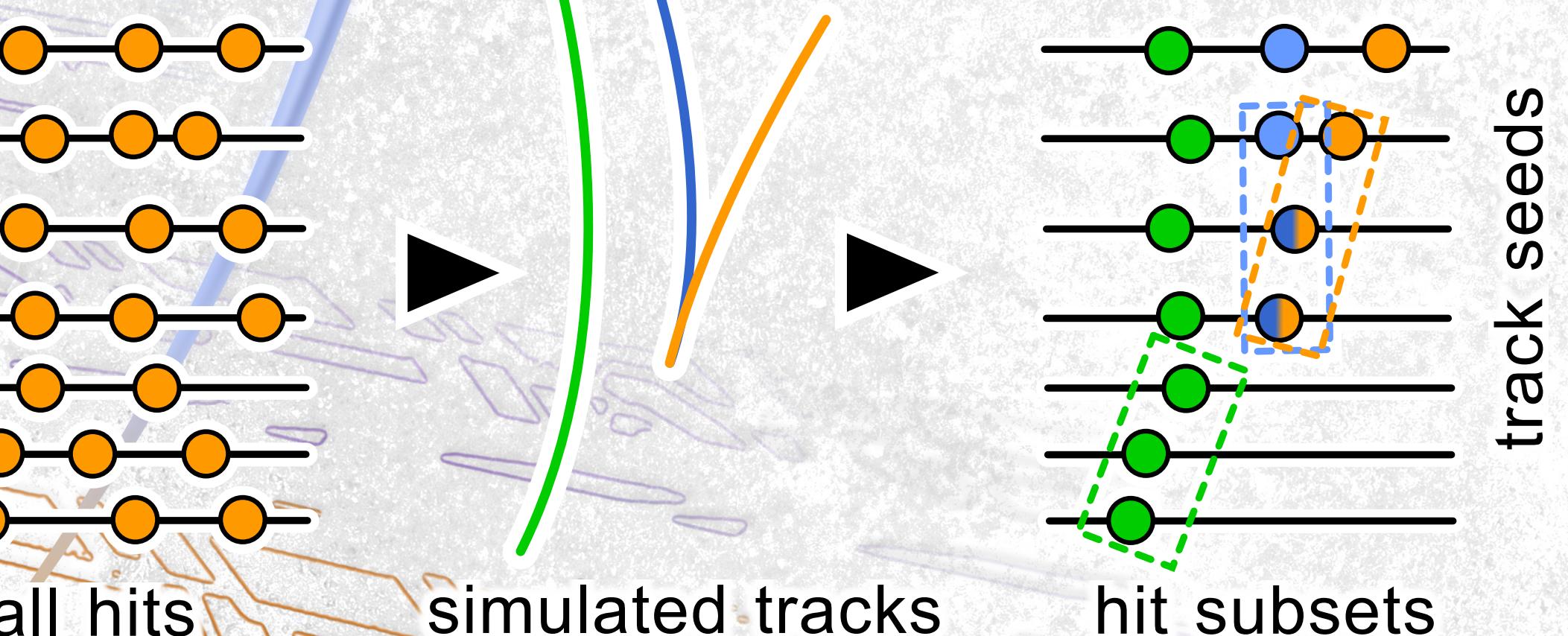
Fast simulation in CMS



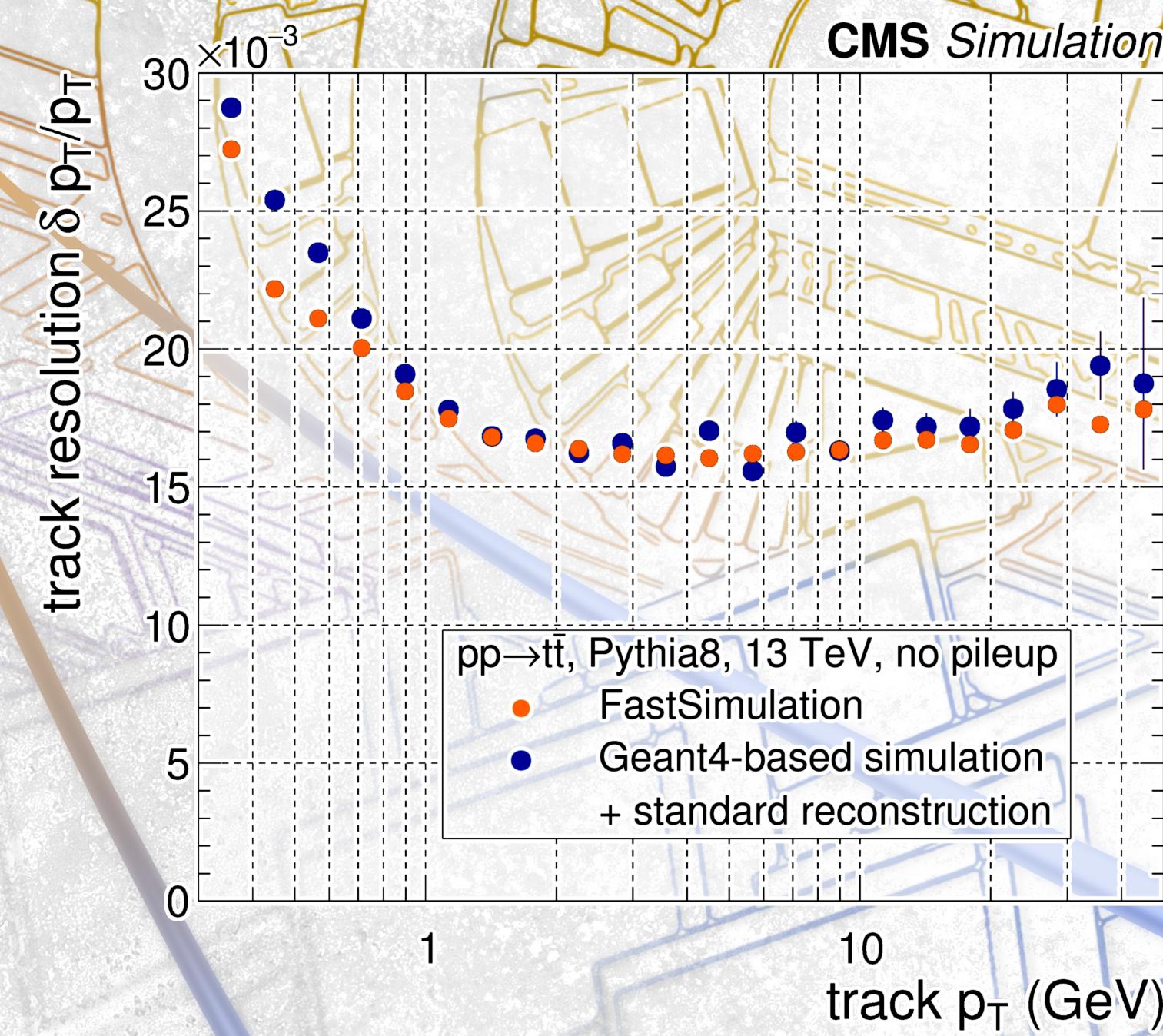
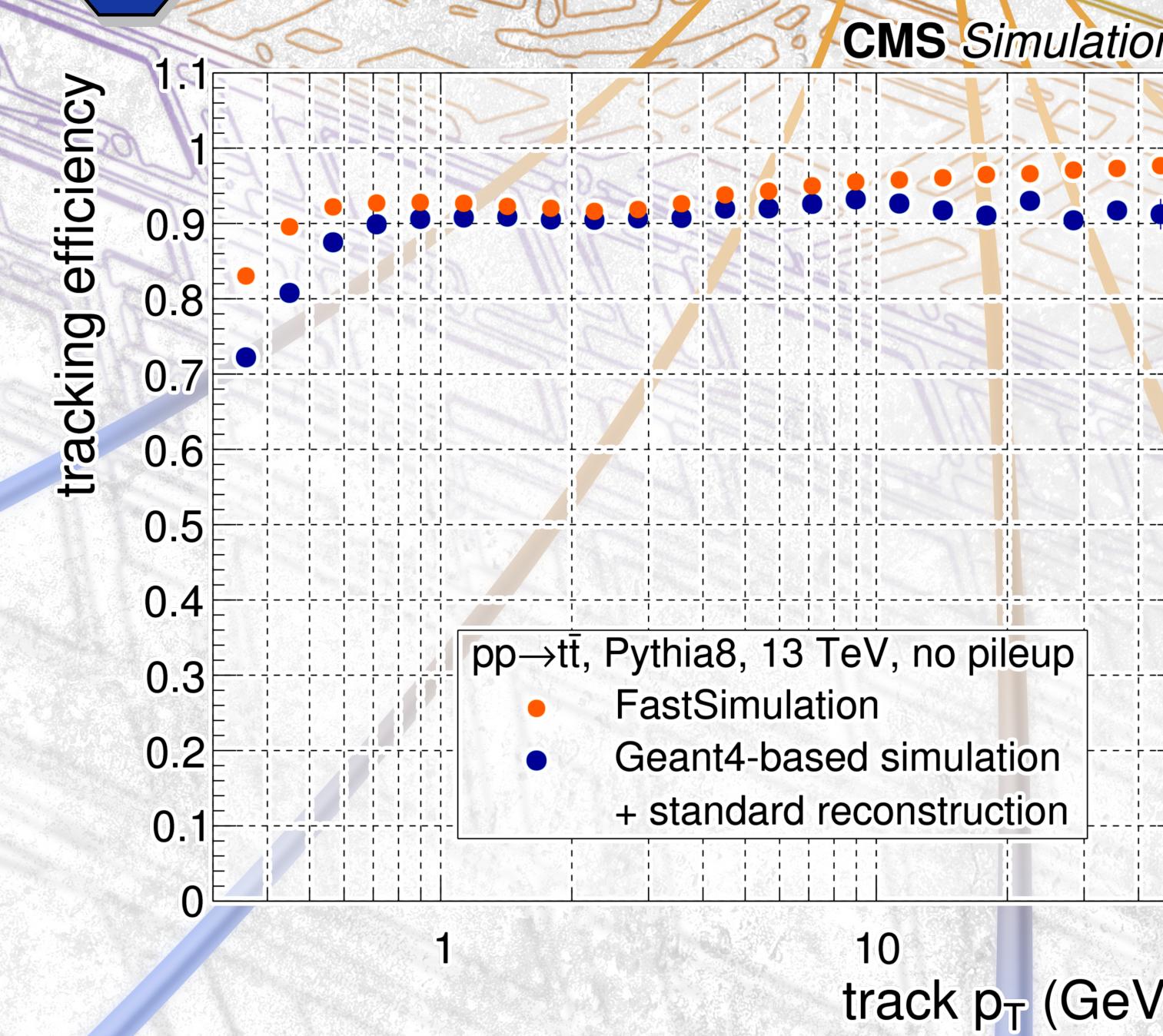
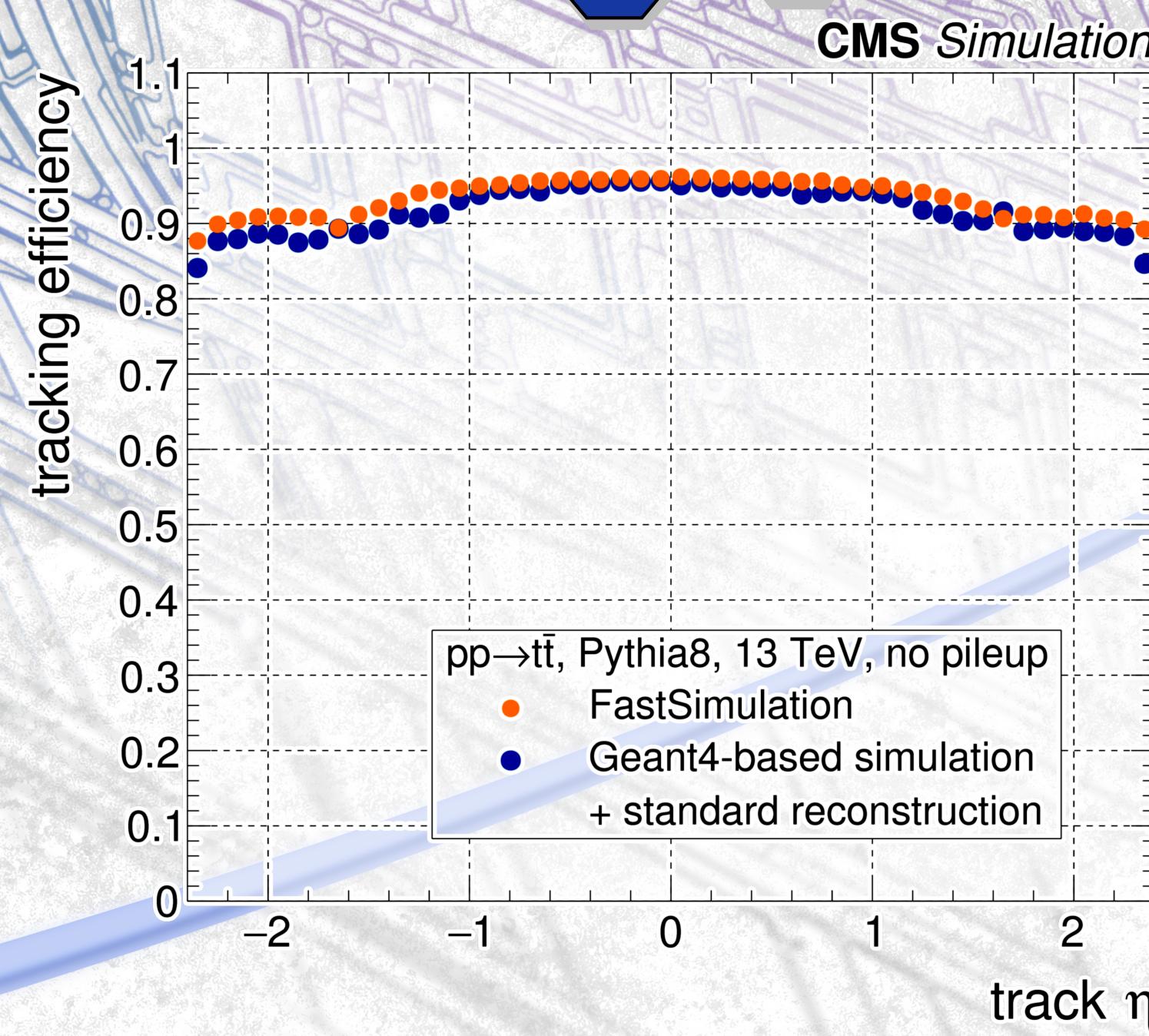
- scan parameters in searches for new physics (e.g. SUSY)
- assess systematic uncertainties
- increase training statistics for multivariate classifiers

Fast tracking

- skip hit permutations using MC-truth information
- apply standard quality & acceptance selection
- neglect fake tracks from combinatorial background



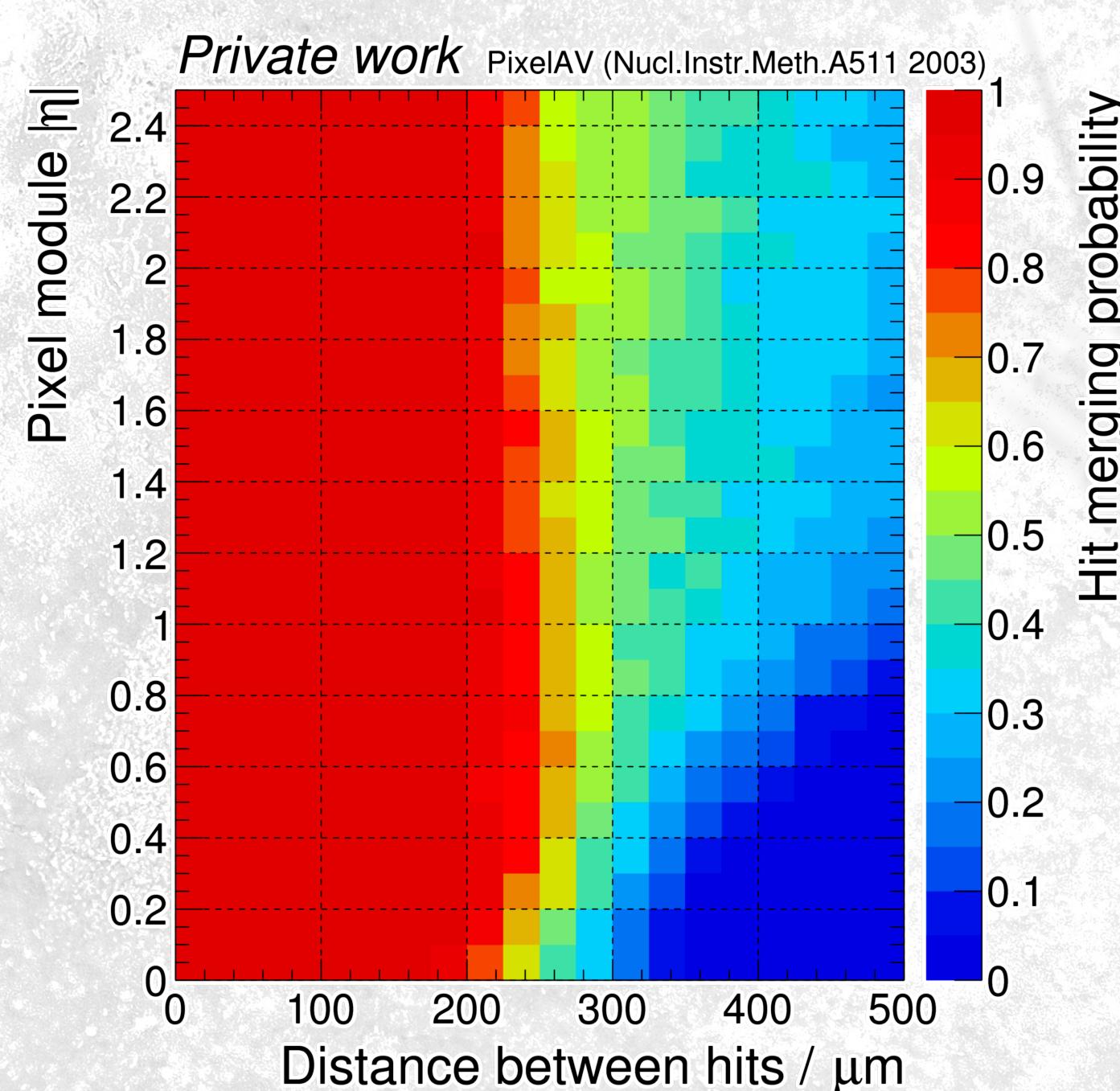
Validation



- good agreement between standard & fast simulation + reconstruction is achieved
- residual differences are mitigated in analyses using dedicated scale factors

Hit reconstruction

- smear simulated hit position using tuned Gaussian functions (strips) or resolution templates (pixels)
- merge hits if too close (work in progress)



Performance

- sample production can run from MC generator to analysis objects in just 1 job (memory usage up to 3 GB)
- only 10-20s per event (standard: ~1-2 min.)
- tracking not amongst top CPU consumers

