Razor Analysis of *R*-Parity Conserving SUSY Events

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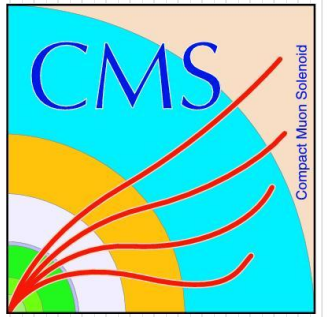
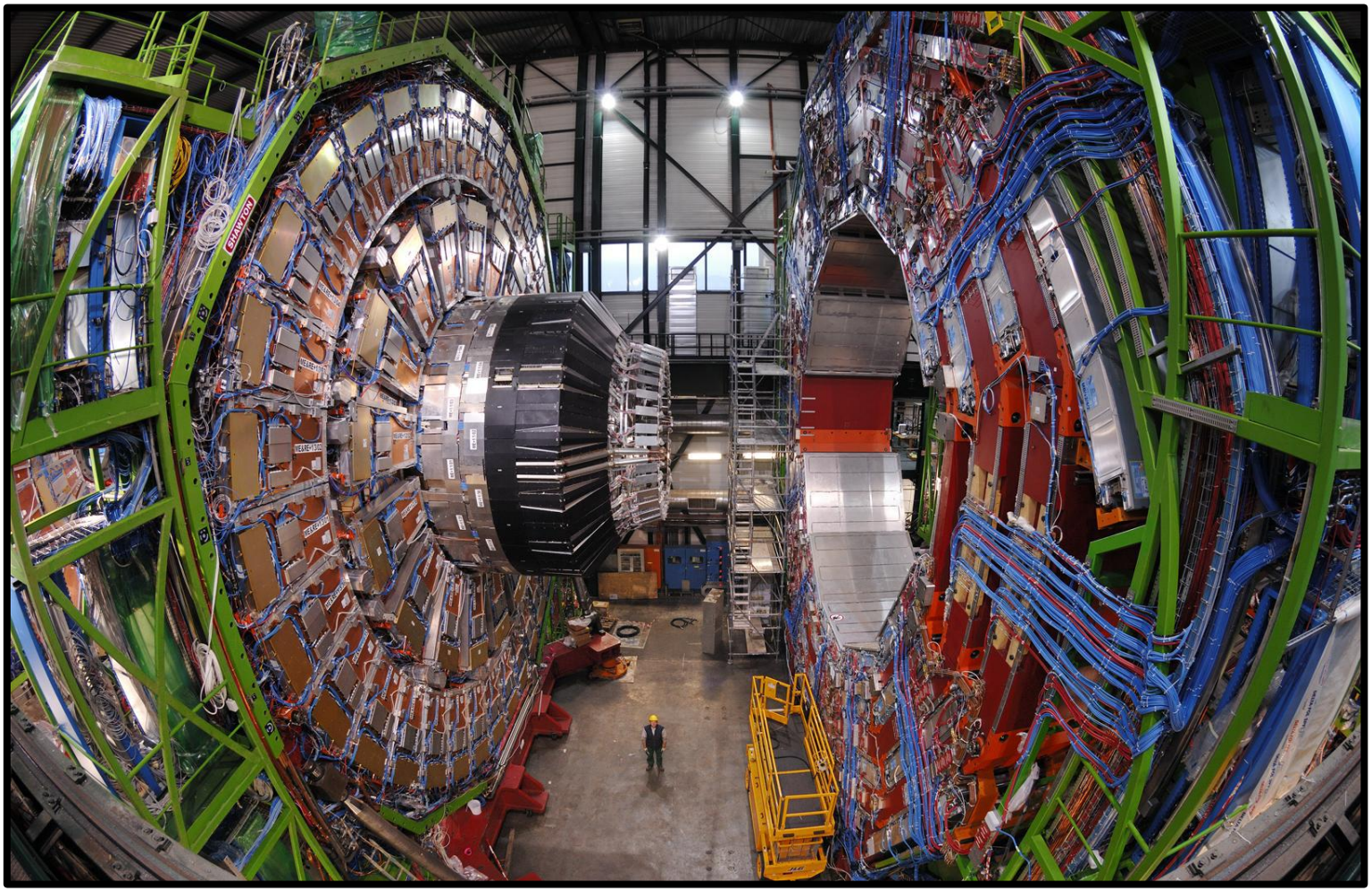


The CMS Experiment

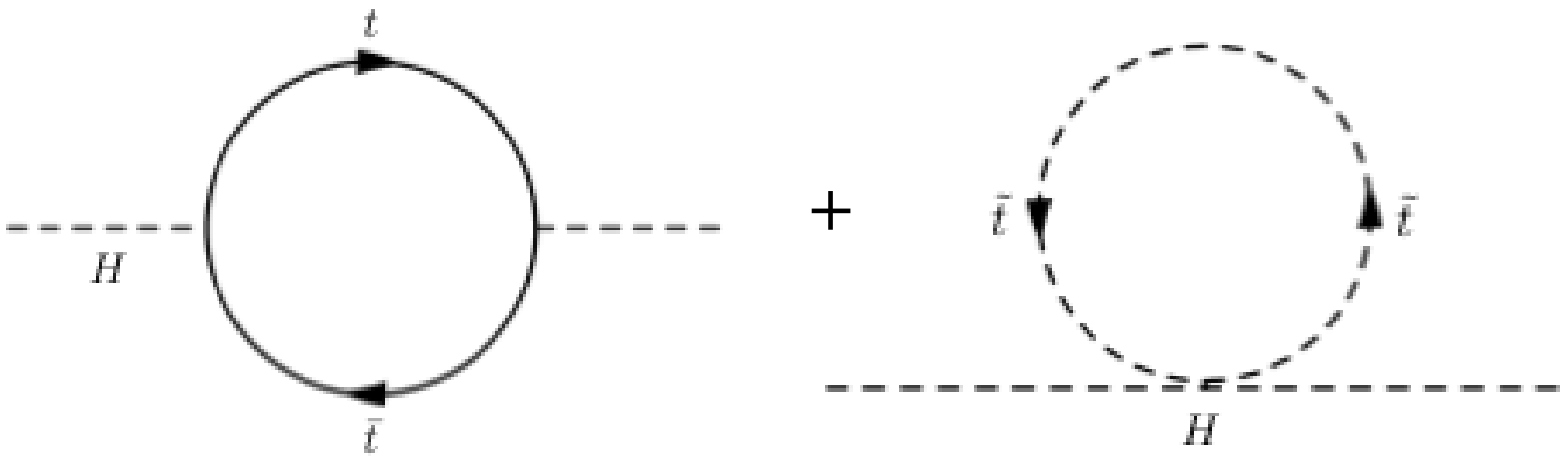
- Importance beyond Fundamental Physics: Grid Computing, Medical Physics, Superconductors



The Big Picture – Why SUSY?

- **Supersymmetry**
  - In theory – postulated symmetry linking bosonic and fermionic states

- **Physical Significance**
  - Unification of the Strong, Weak, and Electromagnetic Forces
  - Solution to the Hierarchy Problem – quantum corrections to the Higgs mass diverge quadratically in the Standard Model



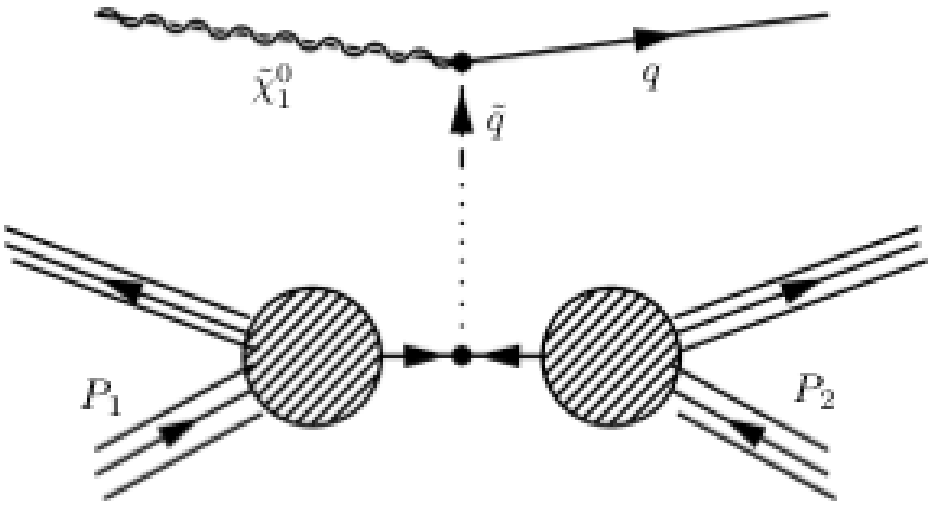
Dark Matter

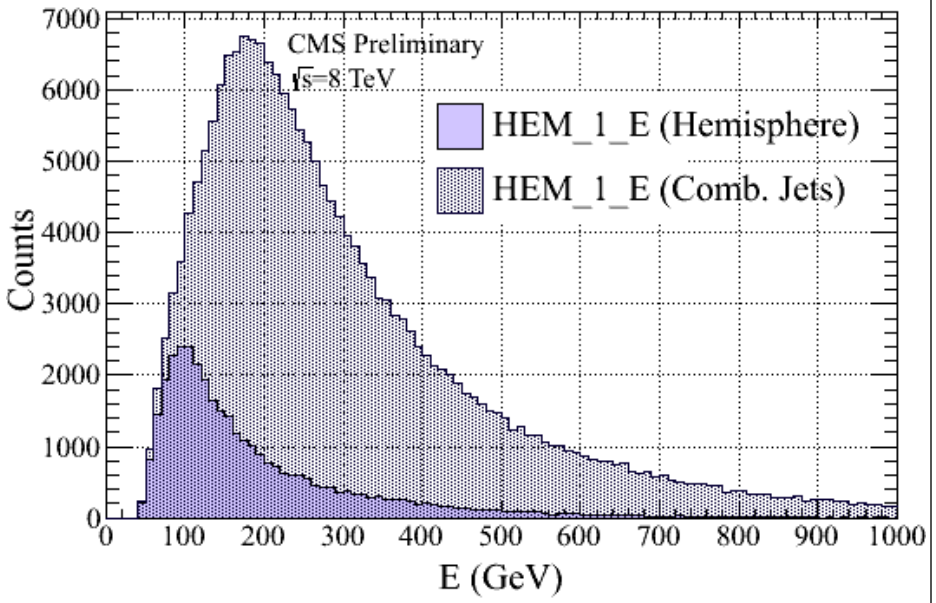
- Conserved discrete ***R*** quantum number in the Minimal Supersymmetric Standard Model (MSSM)

- Consequences of ***R***-parity conservation
  - SUSY particles are pair-produced from SM decay events
  - The lightest SUSY particle (LSP) is stable (dark matter candidate)

My Project

- Missing E_T from SUSY events and background both fall exponentially
- Project: collapse events into dijet topologies and use kinematic variables R and M_R to search for MSSM SUSY signals. Determine whether initial-state radiation (ISR) can be used to distinguish SUSY events from background.





- Future Challenges – appropriate cuts on large QCD multijet background (e.g. $Z(\nu\bar{\nu})$ + Jets, $W(\ell\nu)$ + Jets)

Adventures