

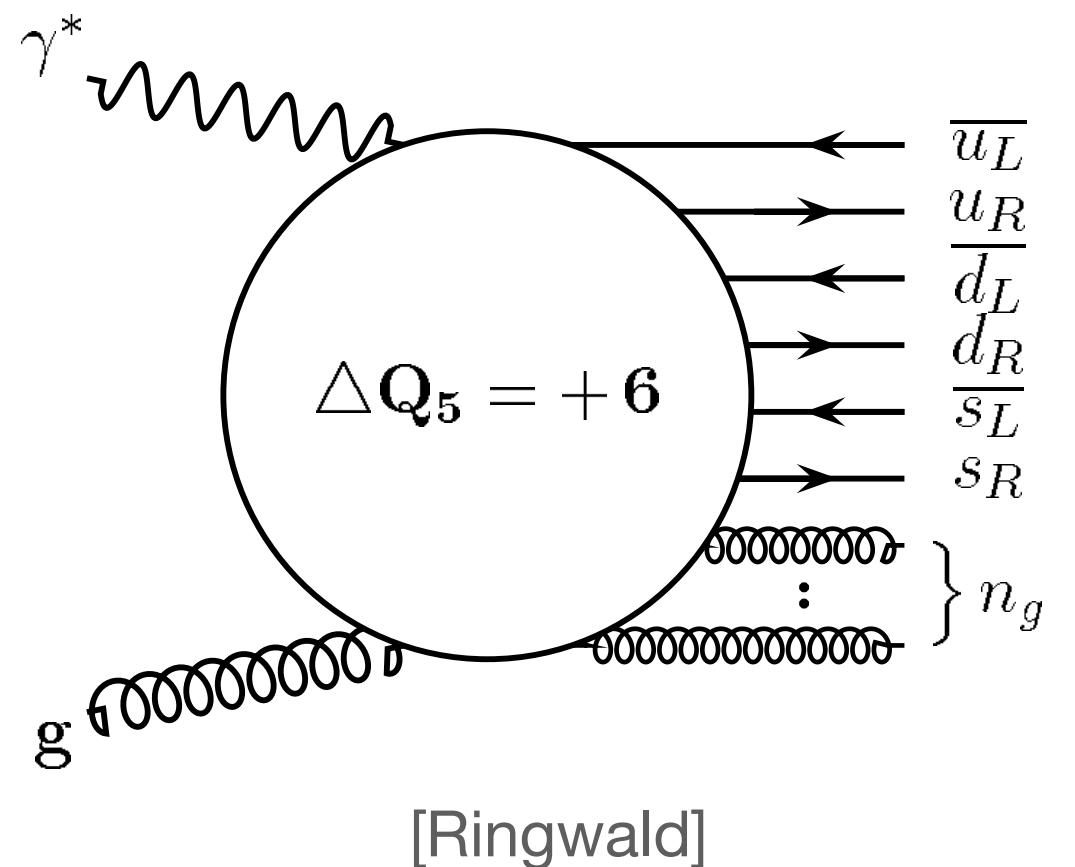
Discussion: Collider Signatures

“Topological Effects in the Standard Model: Instantons, Sphalerons and Beyond at LHC”, 15-17 December 2020.

Stefan Gieseke & Andreas Papaefstathiou

“QCD Instanton” signatures

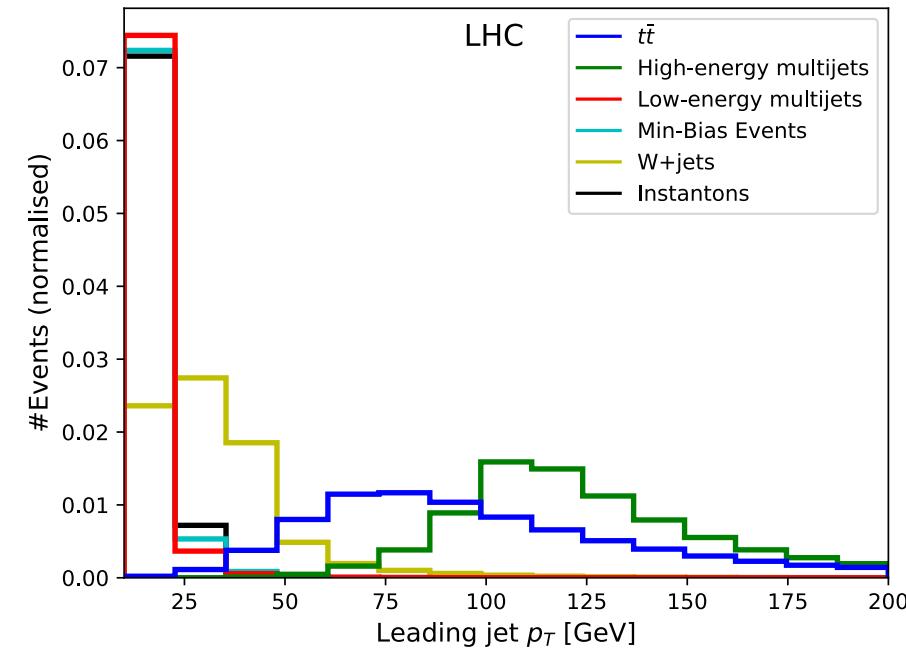
[See Wednesday’s talks: Shuryak, Ringwald, Khoze and Friday’s talks: Plätzer, Geiser, Amoroso & contributions]



- **Uncertainties:**
 - How large are they? Orders of magnitude [see MLM’s remarks].
 - Impact on event simulation (kinematical distributions)?
 - By definition effects always hidden/covered by perturb. uncertainties? [Geiser].
 - Look for explicit chirality violation? Long-range correlations? [Geiser].

“QCD Instanton” signatures

- Particles involved in signature are **soft**: do not pass triggers.



→ Minimum bias trigger with event shape observables? [Khoze, Amoroso]. [Khoze]
[Amoroso]

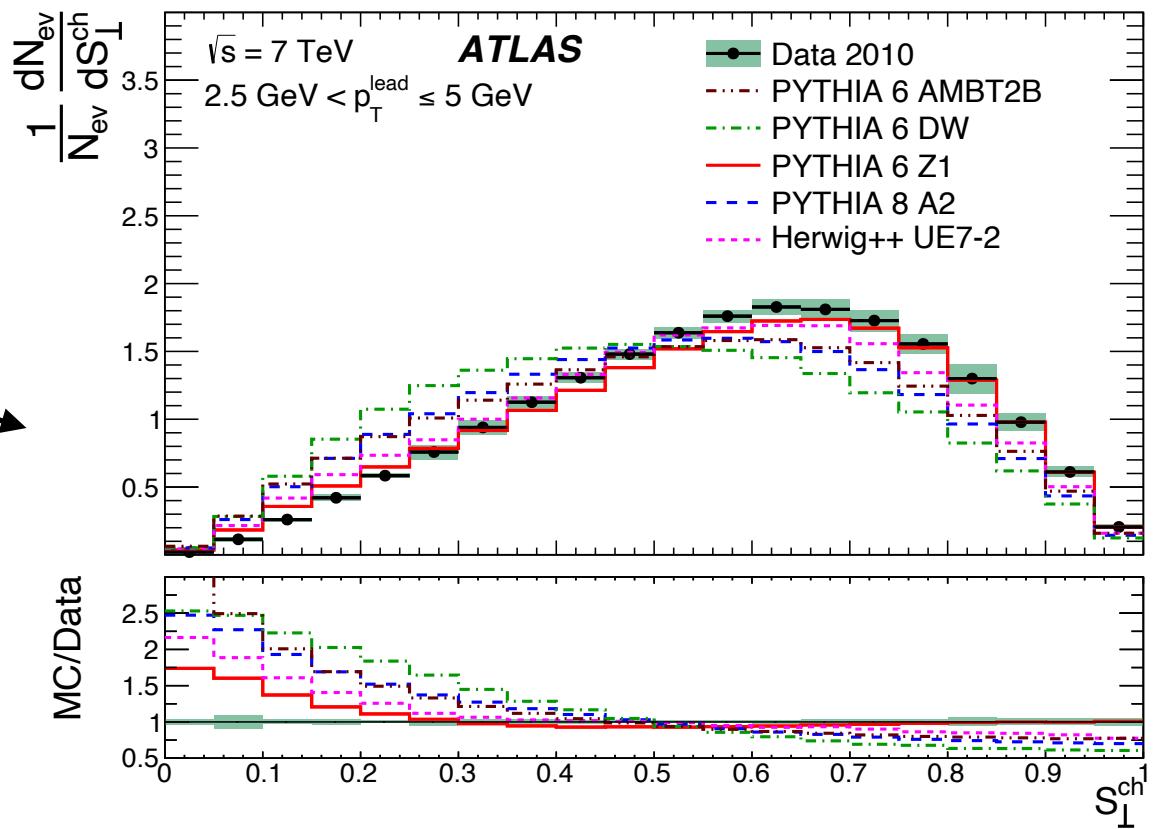
- Backgrounds** and interplay with **soft QCD** models:

→ Are signals “getting tuned” in Monte Carlos [Amoroso]?

→ Are the QCD background rates reliable?

- Simulation:**

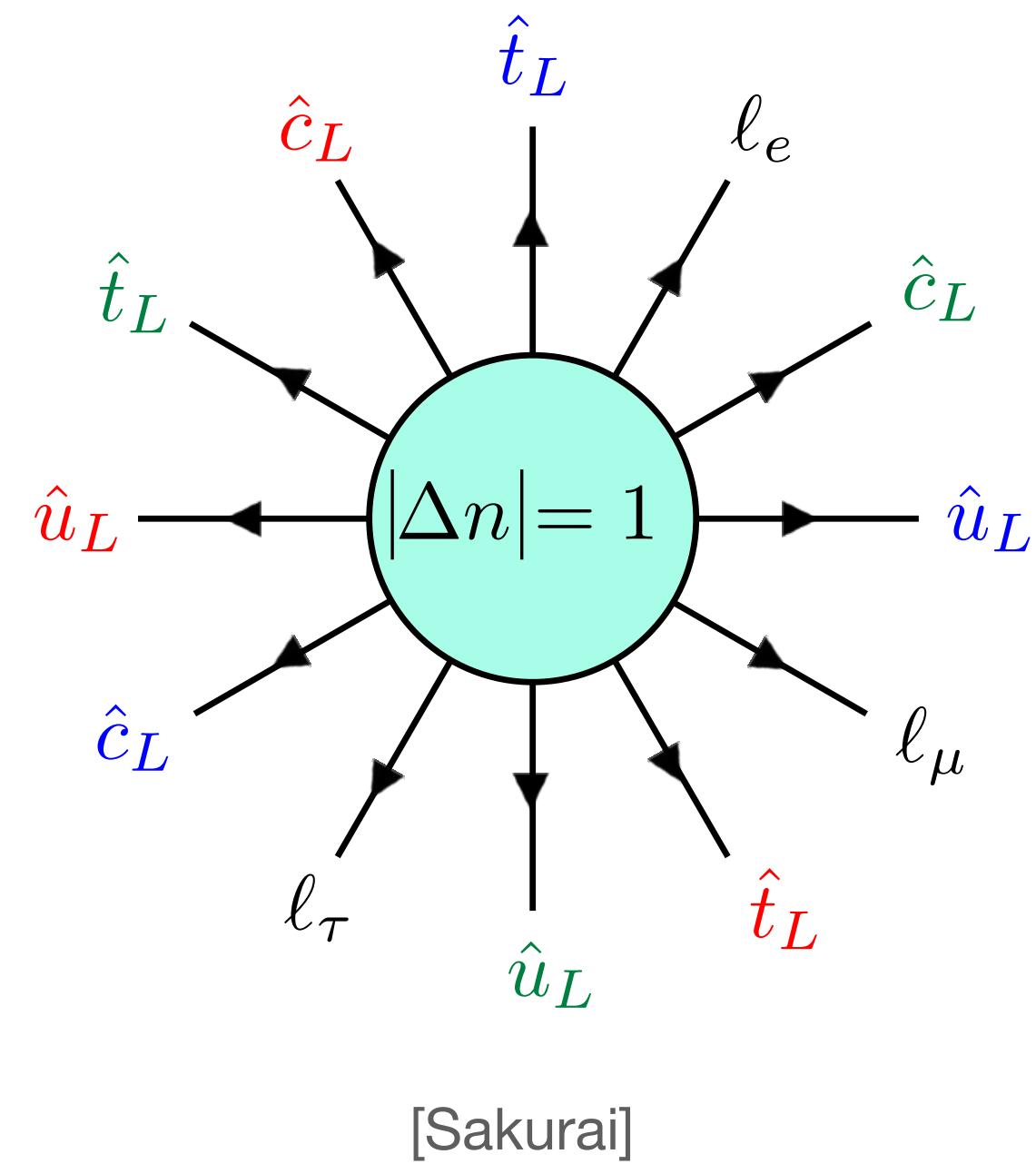
→ Radiation pattern & hadronization [Plätzer].



“EW Sphaleron” signatures

[See Thursday's talks: Sakurai, Dvali, Schwaller and contributions]

- Search for **multi-gauge boson** final states?
- Search for **explicit B+L violation?** (a smoking gun) [Geiser]
- Relevant **backgrounds?**
 - if SM, are they reliable?
- **Discrimination:** e.g. vs microscopic black holes.
- **BSM Sphalerons?** [Sakurai].
- **Simulation:**
 - B non-conservation & colour reconnection, coverage of phase space [Plätzer].



[Sakurai]