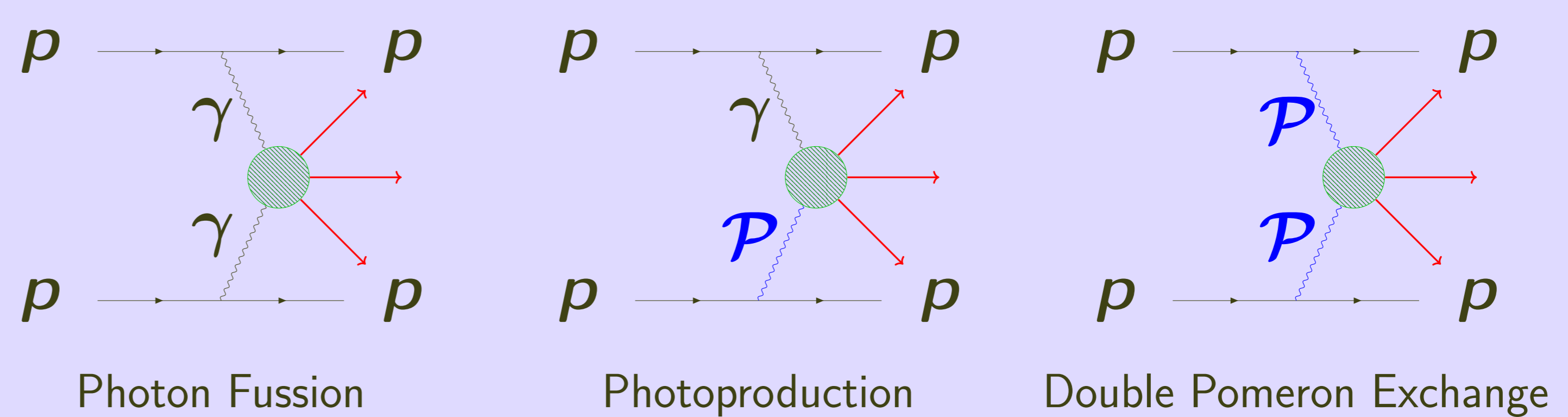


## Central Exclusive Production

- ▶ A subclass of diffractive processes, i.e. without proton dissociation
- ▶ Characterized by large rapidity gaps between the central system and outgoing protons
- ▶ Very clean final state signature
- ▶ Number of phenomenological models proposed, however they are evolving rapidly



## Monte Carlo generators

- ▶ Used to produce simulated event samples, that are a necessary part of any physical analysis
- ▶ General purpose generators (e.g. Pythia) exist, but are hard to modify and depend on a strict release cycle
- ▶ Existing dedicated generators are either Fortran based or are interfacing Fortran via C++
- ▶ Modern generators in an early phase of development

## GenEx

- ▶ Work in progress
- ▶ Based on GenEx Light [1]
- ▶ Modular C++ implementation
- ▶ Uses Foam for phase space integration [2]
- ▶ Simple and lightweight
- ▶ Multithreading support
- ▶ Easy implementing of new models

## New model implementation

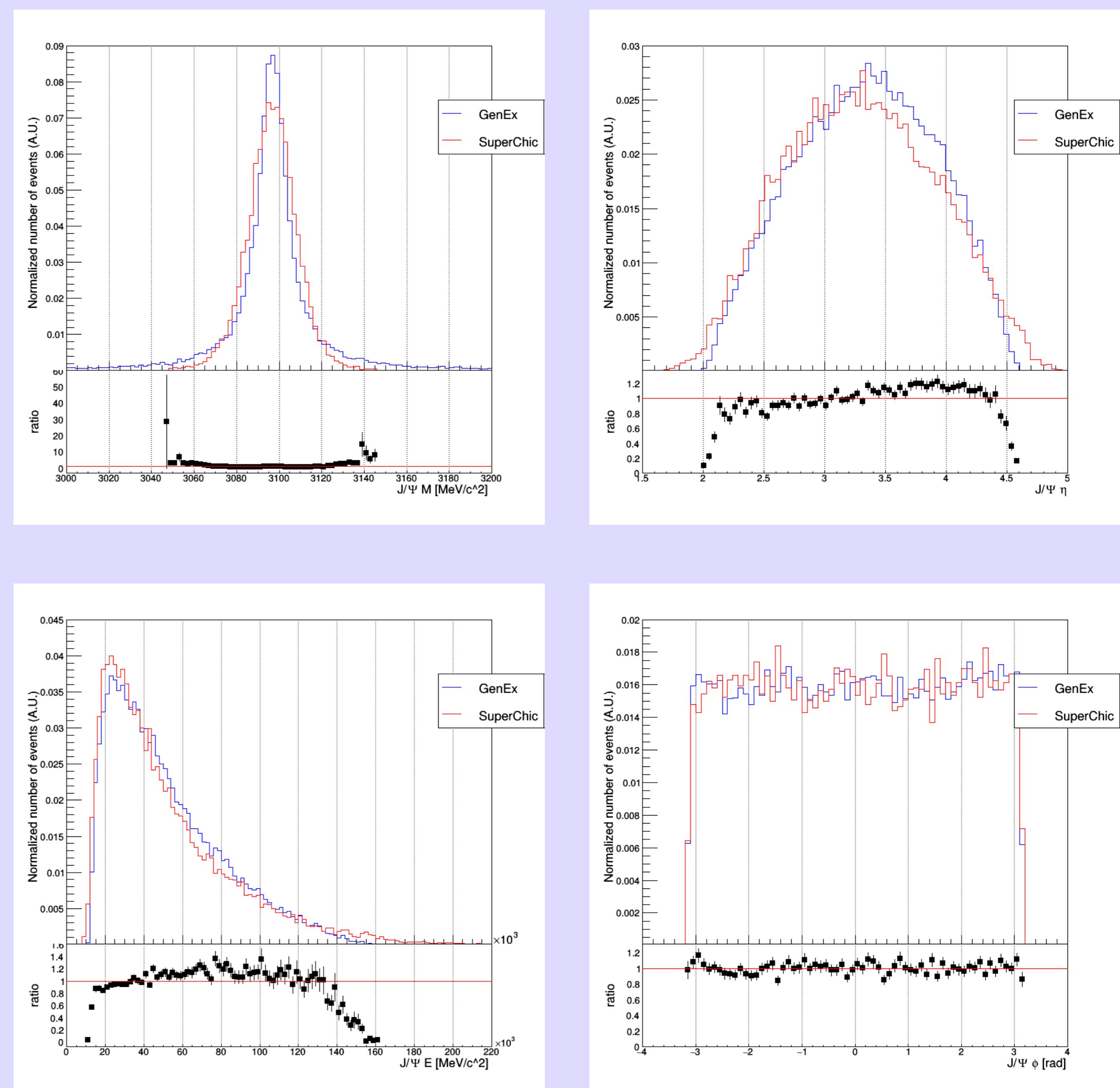
- ▶ Introducing a new theoretical model is as simple as defining a model class, that derives from the base model class and contains a virtual function returning the square of amplitude for processed event and adding it to the process list
- ▶ The base class handles the transfer of settings and kinematics information

## Implemented processes

- ▶  $K_T$  factorization approach:
  - ▶ Resonant production of  $J/\psi$  [3] and  $\phi$  [4] mesons
- ▶ Tensor model [5] approach:
  - ▶  $f_0(980) \rightarrow \pi\pi$
  - ▶ Non-resonant pion pair production

## Validation

- ▶ Basic distributions have been compared against a Monte Carlo sample of  $J/\psi \rightarrow \mu\mu$  from the SuperChic generator [6]
- ▶ Good agreement with slight discrepancies due to model differences



## References

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3. A. Cisek, W. Schäfer, and A. Szczurek, "Exclusive photoproduction of charmonia in  $\gamma p \rightarrow Vp$  and  $pp \rightarrow pVp$  reactions within  $k_t$ -factorization approach," JHEP, vol. 04, p. 159, 2015.
4. A. Cisek, W. Schäfer, and A. Szczurek, "Exclusive photoproduction of  $\phi$  meson in  $\gamma p \rightarrow \phi p$  and  $pp \rightarrow p\phi p$  reactions," Phys. Lett., vol. B690, pp. 168–174, 2010.
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6. L.A. Harland-Lang, V.A. Khoze, M.G. Ryskin "Exclusive physics at the LHC with SuperChic 2" arXiv:1508.02718