

# Past work and interests

## 1-loop Amplitudes

- Virtual amplitude for  $2 \rightarrow 4$  processes:  $pp \rightarrow W^+W^+jj$  and  $pp \rightarrow W^+W^-jj$ .
- $D$ -dimensional generalised unitarity and OPP reduction. Using Berends-Giele recursion relations for amplitudes. Also a Feynman diagram based program.

## Collider phenomenology

- NLO predictions for SM processes above. Implemented in MCFM framework - Born, Virtual, Real. Catani-Seymour: real subtraction, integrated dipoles.
- **POWHEG** implementation of  $W^+W^-$ ,  $W^+Z$ ,  $ZZ$  production at the LHC, and of  $pp \rightarrow W^+W^+jj$ .
- Anomalous trilinear gauge couplings in **POWHEG** using effective Lagrangian.
- Spin determination in a BSM scenario  $pp \rightarrow Y\bar{Y} \rightarrow X\bar{X}l\bar{l}$  - new variable insensitive to  $X$  mass.

## Current interests and future work

- More ATGCs (neutral ones, **POWHEG**).
- Learning more about effective field theories - general BSM Lagrangians (consistent with symmetry, lorentz, unitarity), NLO calculations.
- New SM NLO calculations (QCD+EW) + interfacing with parton shower.
- Spin correlations, spin and mass determination.
- Structure of amplitudes. Ideas from  $\mathcal{N} = 4$ , twistor group. Different types of recursion relations (BCFW,CSW).