Contribution ID: **20** Type: **Poster contribution**

# Next to SV resummed prediction for pseudoscalar Higgs boson production at NNLO+$\overline{\text{NNLL}}$

We present the first results on the resummation of Next-to-Soft Virtual (NSV) logarithms for the threshold production of pseudoscalar Higgs boson through gluon fusion at the LHC. These results are presented after resumming the NSV logarithms of the kind $\log^i(1-z)$ to $\overline{\text{NNLL}}$ accuracy and matching them systematically to the fixed order NNLO cross-sections. These results are obtained using collinear factorization, renormalization group invariance, and recent developments in the NSV resummation techniques. The phenomenological implications of these NSV resummed results for 13 TeV LHC are studied and it is observed that these NSV logarithms are quite large. We also evaluate theory uncertainties and find that the renormalization scale uncertainties get reduced further with the inclusion of NSV corrections at various orders in QCD. We further study the impact of QCD corrections on mixed scalar-pseudoscalar states for different values of the mixing angle $\alpha$.

**Primary authors:** BHATTACHARYA, ARUNIMA; Dr MEDURI CHAKRAVARTULA, Kumar (IIT Guwahati); MATHEWS, Prakash (Saha Institute of Nuclear Physics, Kolkata, India); VAJRAVELU, Ravindran (The Institute of Mathematical Sciences)

**Presenter:** BHATTACHARYA, ARUNIMA