
BNL Omega Group Contributions

— EF04 Topical Group Community Meeting —

May 15, 2020

The group

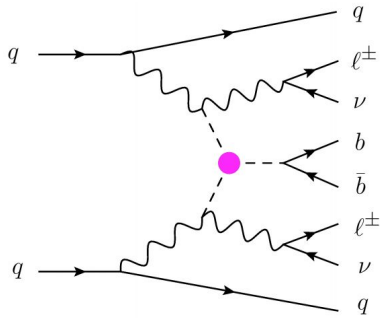
- ❖ BNL Omega Group (ATLAS) participating members:
 - Physicists: Viviana Cavaliere, Marc-André Pleier, Alessandro Tricoli (based at BNL)
 - Post-docs: Gaetano Barone, Jennifer Roloff, Lailin Xu (based at CERN)
- ❖ Also in good collaboration with theorists at BNL

Topics of Interest

- ❖ Novel precision measurements to reduce systematic uncertainties and to enhance sensitivity to new physics
- ❖ Correlated EW (VBF/VBS) measurements and EFT fits
 - Measurements of *ratios* of several processes with complementary sensitivity to EFT parameters
 - VBF Higgs and SM VBF processes: $VBF Wjj$, $H(\rightarrow WW)jj$, $W\rightarrow lv$
 - VBS processes: $WW(\rightarrow l\nu l\nu)jj$, $WZ(\rightarrow l\nu ll)jj$
- ❖ High-energy processes: grow quicker with C.M.E. if BSM present
 - VBS semileptonic final states to study $V_L V_L \rightarrow V_L V_L$ at HL-LHC and beyond
 - WWH measurements ($WW\rightarrow lvjj$, $H\rightarrow bb$)

Backup

Auxiliary materials

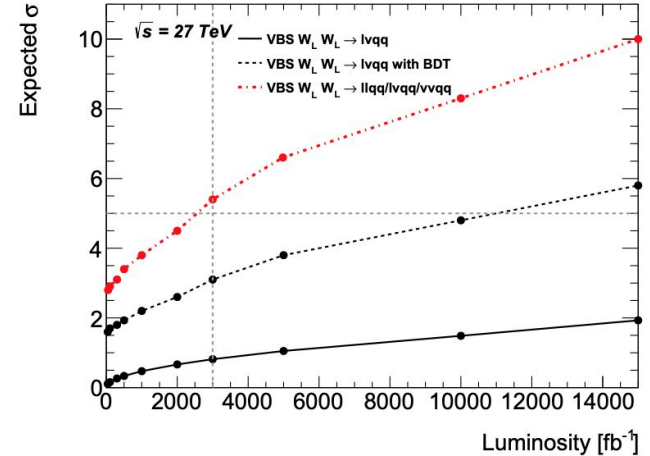


WWH to probe Higgs self couplings

		HC	HwH	Growth
κ_t	\mathcal{O}_{yt}			$\sim \frac{E^2}{\Lambda^2}$
κ_λ	\mathcal{O}_6			$\sim \frac{vE}{\Lambda^2}$
$\kappa_{Z\gamma}$ $\kappa_{\gamma\gamma}$ κ_V	\mathcal{O}_{WW} \mathcal{O}_{BB} \mathcal{O}_T			$\sim \frac{E^2}{\Lambda^2}$
κ_g	\mathcal{O}_{gg}			$\sim \frac{E^2}{\Lambda^2}$

Higgs Couplings without the Higgs,
F. Riva et al

[PRL123\(2019\)181801](https://arxiv.org/abs/1812.00841)



V. Cavaliere et al. [1812.00841](https://arxiv.org/abs/1812.00841)
For HE-LHC projection, not the currently ongoing study