Study of a Kinematic Fit algorithm for the HH->bbyy channel at the ATLAS detector

The search for Higgs bosons pairs, produced at the LHC, is a fundamental step for the study and understanding of the Higgs field potential, responsible for the spontaneous breaking of the electro-weak symmetry. In fact, the observation of this rare phenomenon would allow us to have an estimate of the cubic term of the potential. However, due to the low number of expected events, many efforts are currently directed towards the development and optimization of analysis algorithms aimed at increasing experimental sensitivity. This poster will show the implementation and some results of a very promising kinematic fit algorithm used in the decay channel of two Higgs bosons in photons and b-jets pairs, observed with the ATLAS detector. This tool is able to improve the resolution of the hadronic component of the decay thanks to the imposition of kinematic constraints on the individual events, which in turns improves our ability to reject the non-resonant $\gamma\gamma$ background, allowing to determine more stringent confidence intervals on the tri-linear coupling.

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