Contribution ID: **92** Type: **not specified**

The 130 GeV gamma-ray line and generic dark matter model building constraints from continuum gamma rays, radio and antiproton data

Wednesday 22 May 2013 15:00 (25 minutes)

An analysis of the Fermi gamma ray space telescope data has recently revealed a resolved gamma-ray feature close to the galactic center which is consistent with monochromatic photons at an energy of about 130 GeV. If interpreted in terms of dark matter (DM) annihilating into \gamma \gamma, this would correspond to a DM particle mass of roughly 130 GeV. The rate for these loop-suppressed processes, however, is larger than typically expected for thermally produced DM. Correspondingly, one would generically expect even larger tree level production rates of standard model fermions or gauge bosons. Here, we quantify this expectation in a rather model-independent way by relating the tree level and loop amplitudes with the help of the optical theorem. As an application, we consider bounds from continuum gamma rays, radio and antiproton data on the tree level amplitudes and translate them into constraints on the loop amplitudes. We find that, independently of the DM production mechanism, any DM model aiming at explaining the line signal in terms of charged standard model particles running in the loop is in rather strong tension with at least one of these constraints, with the exception of loops dominated by top quarks. We stress that attempts to explain the 130 GeV feature with internal bremsstrahlung do not suffer from such difficulties. (based on arXiv:1211.6739)

Presenter: ASANO, Masaki

Session Classification: Parallel Session on Dark Matter