

DESY Seminar

5 April 2005, 17:00, DESY Hörsaal

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Indirect Evidence for Dark Matter Annihilation from the EGRET Excess of Diffuse Galactic Gamma Rays

The excess of diffuse galactic gamma rays in the range between 1 and 100 GeV, as observed by the EGRET telescope on the NASA Compton Gamma Ray Observatory, shows all the key features from Dark Matter (DM) annihilation:

1. the energy spectrum of the excess is the same in all sky directions and is consistent with the gammas from the fragmentation of mono-energetic quarks, as expected from DM annihilation; From the excess the DM particle mass is estimated between 50-100 GeV;
 2. the intensity distribution of the excess in the sky is used to determine the halo profile, which, outside the plane of the galaxy, is found to correspond to an isothermal (cored) profile falling as $1/r^2$;
 3. in the plane of the galaxy the excess shows a strong substructure: two doughnut-shaped rings at radii of 4 and 14 kpc, which are correlated with the ring of molecular hydrogen at 4 kpc and the ring of stars at 14 kpc, thought to originate from the infall of a dwarf galaxy;
 4. the mass in these rings is estimated from the intensity of the excess of gamma rays and is used to explain the hitherto mysterious change of slope of the outer rotation curve of our galaxy;
 5. all features and cross sections are consistent with DM being the supersymmetric partner of the Cosmic Microwave Background. Prospects for direct DM detection and finding the predicted supersymmetric particles at colliders will be discussed.
- Tea and cookies will be served at 16:45 in the lobby.
 - After the seminar there is a chance for private discussions with the speaker over wine and pretzels also in the lobby.