SEMINARIO DEL DEPARTAMENTO DE FÍSICA TEÓRICA

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Detectability of Cold Streams into High-z Galaxies by Ly-alpha Emission as well as Absorption Lines

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Abstract: Cosmological simulations have shown that dark matter haloes are connected to each other by large-scale filamentary structures. Cold gas flowing within this "cosmic web" is believed to be an important source of fuel for star formation at high redshift. In this work, we investigate in detail whether such cold gas of the circum galactic medium is detectable using Lyα and selected metal absorption lines. This is done with the help of high resolution hydrodynamical cosmological adaptive mesh refinement (AMR) simulations and assuming photoionisation equilibrium with the unabsorbed or absorbed UV background. A detailed comparison of those line profiles to existing observation in the literature is done. We also predict the characteristics of Lyα emission from cold gas streams. The Lyα luminosity in our simulations is powered by the release of gravitational energy as gas flows from the intergalactic medium into the halo potential wells. Our simulated Lyα Blobs (LABs) are similar in luminosity, morphology and extent to the observed LABs, with distinct kinematic features. This mechanism for producing LABs appears inevitable in many high-z galaxies. Some of the LABs may thus be regarded as direct detections of the cold streams that drove galaxy evolution at high z.

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