

First Stars and Extragalactic Background Light: new constraints to the model through the study of the photon-photon absorption

M. Mapelli

SISSA

In recent years (Bond, Carr & Hogan 1986, Santos, Bromm & Kamionkowski 2002 ; Salvaterra & Ferrara 2003; Magliocchetti, Salvaterra & Ferrara 2003) it has been proposed that the Near Infrared Background (NIRB) and perhaps part of the Optical Background could be due to the redshifted UV and optical light emitted by Population III stars. If this idea is correct, a good knowledge of the Infrared and Optical Background can help us to understand the metal free star formation history tween Pop III and Pop II stars. An indirect, but efficient way to investigate the Infrared and Optical Background consists in estimating the optical depth on the spectra of distant blazars due to photon-photon absorption. This process is a pair production interaction involving TeV photons of blazar spectra and softer photons belonging to the Infrared-Optical Background. We have calculated the photon-photon absorption provided by the most recent Optical and Infrared Background models (Totani & Takeuchi 2002; Salvaterra & Ferrara 2003) and measurements (Madau & Pozzetti 2000; Bernstein et al. 2002 for the Optical Background; Matsumoto et al. 2000; Wright 2001 for the NIRB; Elbaz et al. 2002; Papovich et al. 2004 for the Middle Infrared Background), obtaining some strong constraint to the Infrared and Optical Background and to the relation between Extragalactic Background Light and Population III stars.

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