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On the missing 2175 Å-bump in the Calzetti extinction curve

J. Fischera[1] and M. Dopita[1,2]

[1] Research School of Astronomy & Astrophysics, Mount Stromlo Observatory, Cotter Road, Weston Creek ACT, 2611 Australia
e-mail: fischera@mso.anu.edu.au
[2] Astronomy Department, Faculty of Science, King Abdulaziz University, PO Box 80203, Jeddah, Saudi Arabia

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Abstract

Aims. The aim of the paper is to give a physical explanation of the absence of the feature in the Calzetti extinction curve.

Methods. We analyze the dust attenuation of a homogeneous source seen through a distant inhomogeneous distant screen. The inhomogeneities are described through an idealized isothermal turbulent medium where the probability distribution function (PDF) of the column density is log-normal. In addition it is assumed that below a certain critical column density the carriers of the extinction bump at 2175 Å are being destroyed by the ambient UV radiation field.

Results. Turbulence is found to be a natural explanation not only of the flatter curvature of the Calzetti extinction curve but also of the missing bump provided the critical column density is $N_H \geq 10^{21}$ cm^{-2}. The density contrast needed to explain both characteristics is well consistent with the Mach number of the cold neutral medium of our own Galaxy which suggests a density contrast $\sigma_{\rho/\rho} \approx 6$.

Key words: turbulence / dust, extinction / ISM: structure

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