

PHOTOMETRY OF THE INTERGALACTIC BACKGROUND LIGHT IN THE COMA CLUSTER

Kalevi Mattila  
 University of Helsinki, Observatory and Astrophysics  
 Laboratory

A very faint intergalactic background light component (to be called IBL) was photographically discovered by Zwicky (1957) in the centre of the Coma Cluster. More recently Welch & Sastry (1971,1972) have mapped the area using isodensity tracings of photographic plates. In order to provide an accurate calibration of the intensity and to determine the colour of the IBL in the Coma Cluster, photoelectrical observations have been made of a region located  $\sim 2'$  east of IC 3949 and  $\sim 12'$  south-west of the cluster centre. The observations were made using a 60-cm Ritchey-Chretien telescope at the Metsähovi Observatory near Helsinki. The diaphragm size was  $115''$ . In Table I the results of these observations are given together with three other available photoelectrical values for the IBL intensity in clusters. For comparison, the surface brightness due to visible galaxies has been estimated. The resulting values are:  $I_V = 11.6 S_{10}$  ( $\cong 25.1$  mag sec $^{-2}$ ),  $I_B = 4.6 S_{10}$  ( $\cong 26.1$  mag sec $^{-2}$ ), and thus the IBL intensity amounts to 25 percent and 39 percent in V and B, respectively, of the light of visible galaxies. For the colour index of the IBL one obtains using the values in Table I:  $B-V = 0.54 \pm 0.18$ . Two mechanisms have been hitherto proposed in the literature to explain the IBL in the Coma Cluster: (1) light from dwarf galaxies, intergalactic globular clusters or individual intergalactic stars, and (2) thermal bremsstrahlung from a hot intergalactic gas with  $T_e = 0.5 - 10 \times 10^5$  K. A third possible mechanism can still be mentioned, namely the scattering of the light of galaxies by intergalactic dust grains.

Table I  
 Photoelectric observations of the IBL in clusters of galaxies

Cluster and Position	IBL intensity		Colour	Reference
	mag sec $^{-2}$	$S_{10}$		
Coma centre	26.2	4.4	B	de Vaucouleurs (1970)
Coma $r=12'$ SW	26.2	$2.9 \pm 0.28$	V	Present paper
Coma $r=12'$ SW	27.2	$1.8 \pm 0.24$	B	Present paper
Abell 1132	26.2	4.4	V	Baum (1973)
Abell 801	26.7	2.7	V	Baum (1973)

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