Invited lecture

PLASMA ANALOGUE FOR ASTROPHYSICAL DUST

I. Stefanović, E. Kovačević, J. Berndt, J. Winter

Institut für Experimentalphysik II, (Anwendungsorientierteplasmaphysik),
Ruhr-Universität Bochum, Geb. NB5/66, 44780 Bochum, Deutschland
e-mail: ilija.stefanovic@rub.de

Carbonaceous compounds are a significant component of interstellar dust and the composition and structure of such materials is therefore of key importance. We present 1.5 μm-15 μm spectra of a plasma polymerized carbonaceous material produced in RF discharge under low pressure, using C_2^{++} H_2^{++} as a precursor component. The plasma polymerization process described here provides a convenient way to make carbonaceous interstellar dust analogs under controlled conditions and to compare their characteristics to astronomical observations. Here, we focus on a comparison to the IR spectra of interstellar dust in the light of the criteria for "good" carbonaceous interstellar dust analogue. The UV bump at extinction curve 217.5 nm is another key feature for understanding the abundance of carbon in interstellar media. We present here some preliminary results of UV extinction on plasma polymerized astro-analogue.

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EMISSION LINES IN X-RAY SPECTRA OF CLUSTERS OF GALAXIES

P. Tozzi

INAF Osservatorio Astronomico di Trieste,
via Tiepolo 11, I-34131 Trieste, Italy
e-mail: tozzi@ts.astro.it

Clusters of galaxies are the largest virialized structures in the Universe. As a result of adiabatic compression and shocks generated by supersonic motion during virialization, a hot thin gas permeating the cluster gravitational potential well is formed. Typically this gas, which is enriched with metals ejected form Supernovae (SNe) explosions through subsequent episodes of star formation, reaches temperatures of several 10^7 K and therefore emits mainly via thermal bremsstrahlung in the X-rays. Strong emission lines may originate by collisional excitation of K- and L-shell transitions in highly ionized elements, such as H- and He-like Iron, Oxygen, Silicon or Sulfur. In the isothermal approximation, the line intensities depend on the abundances of heavy elements, while the continuum intensity is mainly due to Hydrogen and Helium.

Here we discuss the main results in the field of X-ray clusters of galaxies, based on the line diagnostics of X--ray spectra from the diffuse ICM emission. Important results have been established in the last six years thanks to the X-ray satellites Chandra and XMM, concerning both low and high redshift objects.