

ID 25

Tipo de Comunicación: Oral

Sesión Científica: La Vía Láctea y sus Componentes

Título: Fullerenes and fullerene-related molecules in the circumstellar environment of evolved stars

Nombre (Autor que presenta): José Jairo

Apellidos (Autor que presenta): Díaz-Luis

Apellidos y nombre de otros autores: Domingo Aníbal García-Hernández, Arturo Manchado, Franco Cataldo

Resumen:

Fullerenes, highly resistant and stable tridimensional carbon molecules, have attracted much attention since their discovery at laboratory by Kroto and collaborators; e.g., fullerenes and fullerene-related molecules may explain several phenomena in Astrophysics such as the diffuse interstellar bands (DIBs) and the UV bump. The recent detection of the most common fullerenes (C₆₀ and C₇₀) in the circumstellar environment of evolved stars like planetary nebulae (PNe) has raised the idea that other forms of carbon such as hydrogenated fullerenes, buckyonions, and carbon nanotubes may be widespread in the Universe and it has permitted to study the DIBs towards fullerene-rich space environments for the first time. In particular, here we present: i) a study of DIBs in the optical spectra of fullerene-containing PNe and the first possible detection of two diffuse bands of circumstellar origin (diffuse circumstellar bands, DCBs) at 4428 and 5780 Å around PN Tc 1; indeed these DCBs could be associated with very large fullerenes or buckyonions; and ii) the non-detection of fullerene-related molecules such as hydrogenated fullerenes (fulleranes like C₆₀H₃₆ and C₆₀H₁₈) in the 3-5 μm spectral range in C₆₀-rich PNe. Our non-detections together with the (tentative) fulleranes detection in a proto-PN suggests that fulleranes may be formed in the short transition phase between asymptotic giant branch (AGB) stars and PNe but they are quickly destroyed by the UV radiation field from the central star.