The origin of the bipolarity in the post-AGB evolution: the case of OH 231.8+4.2

J. Alcolea, V. Bujarrabal, C. Sanchez Contreras

Observatorio Astronomico Nacional
Apartado de Correos 1143
E-28800 Alcala de Henares (SPAIN)
j.alcolea@oan.es

One of the most debated issues on the post-AGB evolution of mid-mass sources is the question of the origin of the bipolarity often observed in PNe and PPNe. Today, it is firmly established that PNe are the result of the post-AGB evolution of the CEs around AGB sources. However CEs in the AGB are spherically symmetric, as the result of an isotropic mass loss due to photon pressure of the dust grains. Is though that the origin of this symmetry breakup at the end of the AGB, is due to the interaction a fast and highly collimated post-AGB wind of the old spherical CE.

To study the details of this interaction, and the nature and origin of the post-AGB ejections, we have undertaken a series of multi-wavelength imaging of selected post-AGB sources. Here we present the results of our studies on OH 231.8+4.2, a beautiful bipolar nebula surrounding a late AGB star. We have carried out high resolution observations of the molecular component (interferometric maps of CO and some tracers of shock chemistry), the circumstellar dust (broad band NIR imaging), and of the shocked excited hot phase (atomic line long-slit and imaging). These works have been very revealing but we still lack of information on the mid-excitation gas in this source (OH 231.8+4.2 could not be observed with ISO). The study of this component is of fundamental importance for better understanding how the shocks responsible for the nebular bipolarity operated, and what is their energy source. The observations of sub-mm molecular lines are crucial in this respect. On the other hand, due to its large extent, kinematics and molecular richness, this extremely interesting PPNe constitutes an ideal target for the HIFI instrument on-board the FIRST satellite.