Kinematics and Dynamics of Galactic Planetary Nebulae

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Planetary Nebulae (PNe) are transient objects of considerable astrophysical interest: there are thought to descend from low and intermediate initial mass stars and therefore cover a large range of ages. On the other hand there are easily identified thanks to their bright emission-line spectra. In view of this it is perhaps surprising that little use has been made of PNe for kinematical studies of the Milky Way.

The only dynamical analysis made on a whole galactic sample of PNe has been recently performed (Durand et *al.*, 1996). It consists basically in fitting in a Stäckel potential the PNe kinematics to the projected moments of a 2 Integral axisymmetric distribution function. In order to avoid zeroth order biases due to the extinction in the galactic plane, the extinction-corrected 2.2 μm brightness COBE map, which is in a first approximation a fairly good representation of the projected galactic distribution of AGB and post-AGB populations, has been substituted to the counts density map of PNe. The model fits adequately the zeroth and first moments of the velocity distribution of PNe, but not the second one, especially in the thick disk: this may be the signature of a third Integral in the distribution function, but further studies will be needed to confirm it. The model allows the visualization of the different orbital structures of PNe in the Galaxy. The scale parameters of the major galactic components are derived via the 2 Integral deprojection of the 2.2 μm COBE map.

To date, most kinematical studies of the inner Galaxy are restricted to a small number of Bulge windows, but we need samples covering larger volumes in order to understand the global kinematics and structures of the different Galaxy components. An up-to-date compilation of radial velocities of 860 galactic PNe has been recently performed (Durand et *al.*, 1997a): most kinematical data coming from the literature have been corrected from systematic offsets by comparison with new high resolution data (Zijlstra et *al*, 1996). 90 % of the measurements have accuracies better than 20 km.s^{-1}. The principal aim of this compilation is to improve the kinematics both for the Bulge (Durand et *al*, 1997b) and the Disk (Séchaud et *al.*, 1997) of the Galaxy.

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