

Instituto de Astronomía  
Universidad Nacional Autónoma de México  
Sede Ensenada, Baja California, México

# Seminario de Investigación

*Miércoles, 20 de Junio de 2012*

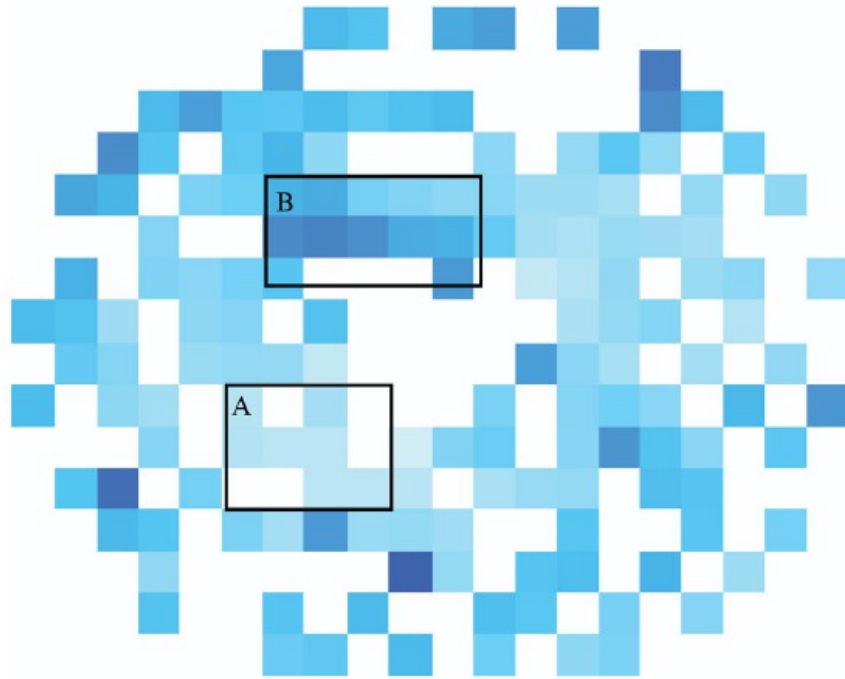
11:00 hrs, Auditorio IA-Ensenada

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*Stavros Akras*

*(IA-UNAM Ensenada)*

## “DISTANCE MAPPING AND THE 3D STRUCTURE OF BD +30<sup>0</sup> 3639”



BD +30<sup>0</sup> 3639 is a member of a group of uncommon planetary nebulae with WolfRayet central star and higher expansion velocities in [OIII] than in [N II] lines. Images and high-resolution spectra from the literature are used in order to construct a 3D model of the nebula using the morpho-kinematic code SHAPE. We find that two homologous expansion laws are needed for the [N II] and [O III] shells. We conclude that the internal velocity field of BD +30<sup>0</sup> 3639 decreases with the distance from the central star at least between the [OIII] and [N II] shells. A cylindrical velocity component is used to replicate the high-speed bipolar collimated outflows. We also present a new kinematic analysis technique called “distance mapping”. It is applied to BD+30<sup>0</sup> 3639 using 178 internal proper motion vectors and our 3D velocity field to determine a distance of  $1.43 \pm 0.21$  kpc. Finally, we find evidence for an interaction between the eastern part of the nebula and the ambient H<sub>2</sub> molecular gas.