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Narrow-Line Regions in Seyfert Galaxies and Quasars: Modelling 2D Kinematics

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Abstract. We attempt to provide new insights into the kinematics of narrow-line regions (NLR) in Seyfert galaxies and quasars, the understanding of which, as well as of their intrinsic 3D morphology, is still rather limited. Motivated by the rise of the integral-field spectroscopy, capable of mapping full 2D velocity fields, and by our observational projects on NLRs (see e.g. Stoklasová *et al.*, this volume) we have developed a computer code producing 2D kinematical maps resulting from projections of various gas geometries and velocity fields.

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Simulated geometries of gas include spheres, disks and rings/tori with various radial/vertical density profiles. Multi-component systems composed of an arbitrary combination of the above distributions, possibly misaligned with each other, are allowed. The modelled line-of-sight velocity distributions reflect rotation/outflows/random motions. The rotation curve is due to several components: super-massive black hole, stellar bulge/disk and dark matter halo. An ionization bi-cone (parametrized by opening angle θ, two orientation angles and length) can be superposed: the emission is then assumed to originate only within the bi-cone. Dust obscuration can be taken into account.

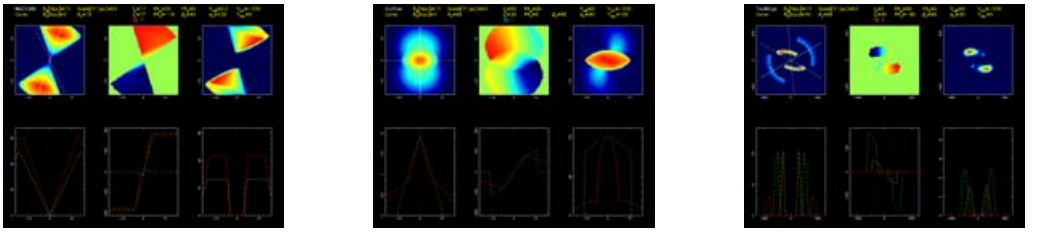

Figure 1. Examples of 3 NLR models (sub-panels show 2D maps and 1D profiles of emission-line intensity, mean LOS velocity and velocity dispersion). *Left:* differentially rotating disk ($I_{disk} = 77^o, PA_{disk} = 25^o$) + ion. cone ($\theta = 70^o$, $I_{cone} = 77^o$, $PA_{cone} = -19^o$) (the galaxy is observed as Sy 2); *Middle:* sphere + ion. cone ($\theta = 90^o$, $I_{cone} = 60^o$) + outflow along the cone (observed as Sy 1); *Right:* two misaligned rotating rings + ion. cone (observed as Sy 2).

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