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Cosimo Marconcini: MOKA3D: innovative approach to 3D AGN outflow kinematic modelling: accurate determination of outflow physical properties

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The determination of outflow physical properties is important to assess the possible effects of Active Galactic Nuclei feedback on host galaxies and to compare observed outflow properties with model predictions. However, current estimates are based on simplified assumptions and do not take into account many observational aspects like projection effects and spatial resolution. I present MOKA3D , a novel method to model the kinematics and orientation of outflows, which is particularly successful in recovering the three-dimensional structure, even in the presence of observed clumpy emission and irregular kinematics. At variance with previous works, this model does not assume a distribution of the observed gas emission flux but uses a novel procedure to derive it directly from observations, reproducing a 3D distribution of the emitting clouds and providing accurate estimates of the outflows physical properties, e.g. the outflow and energy rate as a function of distance from the galaxy nucleus. I have successfully tested the performance of the method with both nearby Seyfert-II galaxies observed with the Multi Unit Spectroscopic Explorer at VLT and high redshift sources observed by JWST, showing that the very complex kinematical features observed can be ascribed to the clouds clumpiness in a very simple radial velocity field, accounted by a suitable geometry.