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Study of the diversity of AGN dust models

Omaira González-Martín

IRyA - Instituto de Radioastronomía y Astrofísica, 3-72 Xangari, 8701, Morelia, Mexico

Abstract. The dust component of active galactic nuclei (AGN) produces a broad infrared spectral energy distribution (SED), whose power and shape depends on the fraction of the source absorbed, and the geometry of the absorber respectively. This emitting region is expected to be concentrated within the inner ∼5 pc of the AGN which makes almost impossible to image it with the current instruments. The study the infrared SED by comparison between infrared AGN spectra and predicted models is one of the few way to infer the properties of this dust component. We explore a set of six dusty models of AGN with available SEDs, namely Fritz *et al.* (2006), Nenkova *et al.* (2008), Hoenig & Kishimoto (2010), Siebenmorgen *et al.* (2015), Stalevski *et al.* (2016), and Hoenig & Kishimoto (2017). They cover a wide range of morphologies, dust distributions and compositions. We explore the discrimination among models and parameter restriction using synthetic spectra (Gonzalez-Martin *et al.* 2019A, submitted), and perform spectral fitting of a sample of 110 AGN with Spitzer/IRS drawn from the Swift/BAT survey (Gonzalez-Martin *et al.* 2019B, submitted). Our conclusion is that most of these models can be discriminated using only mid-infrared spectroscopy as long as the host galaxy contribution is less than 50%. The best model describing sample is the clumpy disk-wind model by Hoenig & Kishimoto (2017). However, large residuals are shown irrespective of the model used, indicating that AGN dust is more complex than models. We found that the parameter space covered by models is not completely adequate. This talk will give tips for observers and modelers to actually answer the question: how is the dust arrange in AGN? This question will be one of the main subjects of future research with JWST in the AGN field.

Keywords. galaxies: active, galaxies: dusty models, galaxies: spectral energy distribution

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