

# How to hide a supermassive black hole: AGN obscuration through dusty infrared dominated flows.

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## Abstract

We explore a detailed model in which the active galactic nucleus (AGN) obscuration results from the extinction of AGN radiation in a global flow driven by the pressure of infrared radiation on dust grains. We assume that external illumination by UV and soft X-rays of the dusty gas located at approximately 1pc away from the supermassive black hole is followed by a conversion of such radiation into IR. Using radiation hydrodynamics simulations in a flux-limited diffusion approximation we find that the external illumination can support a geometrically thick obscuration via outflows driven by infrared radiation pressure in AGN with luminosities greater than 0.05 L<sub>edd</sub> and Compton optical depth,  $> 1$ .