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in Ferarrese 2006, r_b varies from 50 to 500 pc.

PROBING THE INNER KPC OF MASSIVE LENS GALAXIES WITH ALMA: CAN THE CENTRAL IMAGES OF STRONG LENSES BE DETECTED?

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ABSTRACT

We examine the prospects of detecting demagnified images of gravitational lenses in observations of strongly lensed mm-wave molecular emission lines with ALMA. We model the lensing galaxies as a superposition of a dark matter component, a stellar population, and a central supermassive black hole and forecast the detection of the central images for a range of relevant parameters (e.g. stellar core and black hole mass). We find that over a large range of acceptable parameters, future deep observations of lensed molecular lines with ALMA will be able to detect the central images at $\gtrsim 3\sigma$ significance. We use Fisher analysis to examine the constraints that could be placed on these parameters in various scenarios.

Subject headings: black hole physics — gravitational lensing: strong — galaxies: formation — galaxies: high-redshift

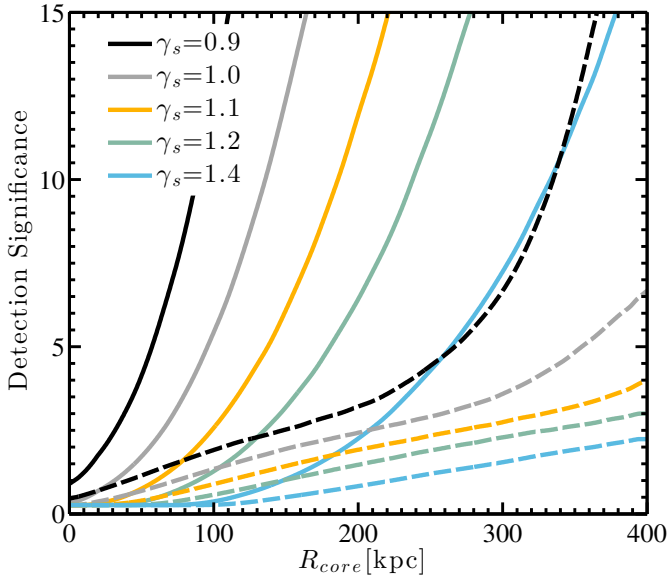

FIG. 1.— Significance of detection of the central image as a function of the stellar core size. The colors correspond to different slopes of the stellar component. The solid curves correspond to a case without a SMBH while the dashed line show the result of a simulation which includes a $2 \times 10^8 M_\odot$ SMBH at its center.