

Abstract Submitted
for the APR13 Meeting of
The American Physical Society

Detection of a Boson Star through Gravitational Lensing AMITAI

BIN-NUN, American Association for the Advancement of Science — Observations of the Sgr A* region in the galactic center have implied a large amount of matter in a small volume, leading to the assumption of a black hole there. However, dynamical observations cannot rule out the presence of a boson star, a compact object made up of scalar particles, as both objects are far more compact than current observational resolutions. While a boson star in the galactic center is disfavored for a number of theoretical considerations, we outline the first test that can directly observe a boson star. We accomplish this by studying the strong gravitational lensing of S stars resulting from the assumption of a boson star in the Galactic Center. Boson stars have an extended mass distribution and are transparent to electromagnetic radiation, giving rise to a radial caustic curve. We calculate the brightness of images formed by stars crossing these radial caustics and show that a boson star would give rise to much brighter images than a black hole with a similar mass and that those images would be easily bright enough to be detected with upcoming instruments.

Amitai Bin-Nun
American Association for the Advancement of Science

Date submitted: 18 Nov 2012

Electronic form version 1.4