PDF versions of previous colloquia and more information can be found in “events” at http://gcosmo.bao.ac.cn/

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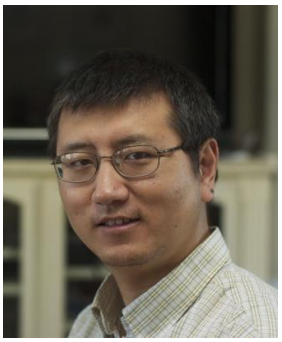
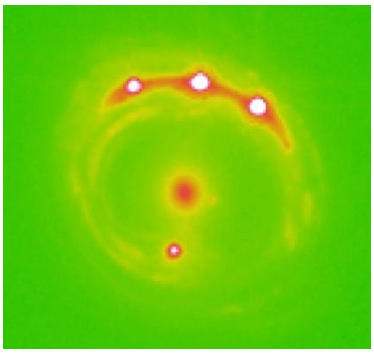
TIME: Friday, 2:30 PM, Dec. 27 2013 LOCATION: A601 NAOC

Microlensing Constraints on Quasar X-ray Emission Regions



Prof. Xinyu Dai (University of Oklahoma)

Dr. Xinyu Dai is an assistant professor at the University of Oklahoma. He obtained his BS degree at Peking University in 1998, and PhD at the Pennsylvania State University in 2004. Afterwards, he was a postdoc researcher at the Ohio State University and University of Michigan. He arrived at OU in 2009 first as a research scientist then as an assistant professor. Dr. Dai's research expertise is in the areas of gravitational lensing, extra-galactic astronomy, and high energy astrophysics. He has published 60 refereed journal papers, and has been PI or Co-I for dozens of research proposals, including research grants and observing time from NASA Headquarters, Chandra, HST, Spitzer, Suzaku, Swift, LBT 8.4m, KPNO 4m, CTIO 4m, Magellan 6.5m, MDM 2.4m, and UH88 telescopes.



Abstract

Gravitational microlensing provides a unique probe of the innermost parts of quasar accretion disks, close to the event horizon of supermassive black holes. We report our long-term monitoring results, including our recent large Chandra program for seven gravitationally lensed quasars: Q2237+0305, RXJ1131-1231, QJ0158-4325, SDSS0924+0219, SDSS1004+4112, HE0435-1223, and HE1104-1805. We discover for the first time chromatic microlensing differences between the soft and hard X-ray bands in the X-ray continuum emission. Our results indicate that the coronae above the accretion disk thought to generate X-rays have a non-uniform electron distribution, and the hard X-ray emission region is smaller than the soft region in two cases tracking the event horizon of black holes. We detect metal emission lines for almost all X-ray images in all lenses. We measure larger equivalent line widths in lensed quasars compared to a large sample of normal non-lensed AGNs of similar luminosities. We conclude that the iron line emission region is smaller than that of the X-ray continuum, possibly resulting from strong gravitational lensing near the black hole. Our results also confirm earlier microlensing results that quasar X-ray emission regions are significantly smaller than the optical emission regions. We also discuss the initial results of our on-going large Chandra Cycle 14/15 monitor program of gravitational lenses.

All are welcome! Tea, coffee, biscuits will be served at 2:15 P.M.