

Science News & Journal Club Public Talk



时 间: 2018年11月30日 12:15 - 1:45pm

地 点: 紫台仙林园区3号楼302室

Science News:

报 告 人: 李 刚

Journal Club Public Talk:

报 告 人: 陈雪纯、郑文雯

报告题目: **Probing the Broad Line Region and the Accretion Disk in the Lensed Quasars HE0435 WFI2033 and HE2149 using Gravitational Microlensing**

报告摘要:

We use single-epoch spectroscopy of three gravitationally lensed quasars, HE0435-1223, WFI2033-4723, and HE2149-2745, to study their inner structure (BLR and continuum source). We detect microlensing-induced magnification in the wings of the broad emission lines of two of the systems (HE04351223 and WFI2033-4723). In the case of WFI2033-4723, microlensing affects two “bumps” in the spectra which are almost symmetrically arranged on the blue (coincident with an Al III emission line) and red wings of C III]. These match the typical double-peaked profile that follows from disk kinematics. The presence of microlensing in the wings of the emission lines indicates the existence of two different regions in the BLR: a relatively small one with kinematics possibly related to an accretion disk, and another one that is substantially more extended and insensitive to microlensing. There is good agreement between the estimated size of the region affected by microlensing in the emission lines, $r_s = 10^{+15} - 7 \text{ pM}/M_{\odot} \text{ light-days}$ (red wing of C IV in HE0435-1223) and $r_s = 11^{+28} - 7 \text{ pM}/M_{\odot} \text{ light-days}$ (C III] bumps in WFI2033-4723) with the sizes inferred from the continuum emission, $r_s = 13^{+5} - 4 \text{ pM}/M_{\odot} \text{ light-days}$ (HE04351223) and $r_s = 10^{+3} - 2 \text{ pM}/M_{\odot} \text{ light-days}$ (WFI2033-4723). For HE2149-2745 we measure an accretion disk size $r_s = 8^{+11} - 5 \text{ pM}/M_{\odot} \text{ light-days}$. The estimates of p , the exponent of the size vs. wavelength ($r_s \propto \lambda^p$), are 1.2 ± 0.6 , 0.8 ± 0.2 , and 0.4 ± 0.3 for HE0435-1223, WFI2033-4723, and HE2149-2745, respectively. In conclusion, the continuum microlensing amplitude in the three quasars and chromaticity in WFI2033-4723 and HE2149-2745 are below expectations for the thin disk model. The disks are larger and their temperature gradients are flatter than predicted by this model.

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