

S22a Soft X-ray Excess Variation Causing Changing-Look Active Galactic Nucleus

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Some active galactic nuclei (AGNs) are reported to change their types determined by strength of broad Balmer lines emitted from a broad line region in ~ 10 years, and called “changing-look” AGNs. However, it is still puzzling what causes their type changes; main possibilities include variation of ionizing flux from an accretion flow onto a supermassive black hole, and change of obscuration against a broad line region.

To reveal the cause, we focused spectral variations in optical, ultraviolet (UV), and X-ray of a type 1 Seyfert Mrk 1018 which has experienced the changing-look phenomenon from type 1.9 to 1 around 1980 (Cohen et al. 1986), and from type 1 to 1.9 around 2010 (McElroy 2016). We analyzed the archival data of Mrk 1018 derived by *XMM-Newton* in 2008, and by *Swift* in 2008, 2013, and 2016, and confirmed that a strong soft X-ray excess emission was present in optical, UV, and X-ray in 2008 when it was bright with the Eddington ratio $\eta \sim 0.08$ and classified as type 1. The soft excess can be reproduced by a thermal Comptonization component from an accretion flow with electron temperature of ~ 0.14 keV and optical depth of ~ 20 which are typical and similar to those in other sources (e.g., Noda et al. 2011, 2013; Petrucci et al. 2017). On the other hand, the soft excess weakened in 2013, and disappeared in 2016 when it was faint with $\eta \sim 0.006$ and classified as type 1.9, making UV flux ~ 2 orders of magnitude lower than that in 2008. Therefore, the changing-look phenomenon in Mrk 1018 is considered to be mainly caused by appearance and disappearance of the soft excess occurring at $\eta \sim$ a few %. We furthermore discuss if the soft excess variation can be interpreted by disk evaporation.