The UV Side of Little Red Dots: Red, Compact, and Iron-Enhanced Rest-UV Emission with a Strong Downturn around Lyα

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Little Red Dots (LRDs) are candidates for growing supermassive black holes newly discovered by the James Webb Space Telescope (JWST), characterized by compact rest-optical morphology, V-shaped spectra, and broad Hydrogen Balmer lines. While recently proposed BH-star/envelope models have made progress in explaining their optical features, their rest-UV emission, which is considered to originate from host galaxies, remains poorly investigated. In this talk, we present a comprehensive analysis of the UV emission, including continuum shapes, emission line strengths, and morphology, using ≃ 100 LRDs selected from the JWST spectral archive. Compared to star-forming galaxies at the same redshifts and UV magnitudes, LRDs show systematically redder UV slopes and more compact UV sizes, indicating that their UV emission cannot be explained solely by normal star-forming galaxies and requires a significant contribution from central red and compact emission. From stacked spectra, we find that the Balmer break strength, UV slope, downturn depth around Lyα, and Fe II equivalent width are positively correlated, while the UV size is anticorrelated with the Balmer break strength, suggesting that diversity in the UV continuum shape reflects the varying dominance of the central emission relative to its host. We also measure Fe II/Mg II ≃ 8–10, higher than in quasars at similar redshifts, further supporting a substantial contribution from the central component. Spectral modeling suggests that the observed red UV continuum cannot be reproduced by host galaxy emission alone, but requires an additional very red continuum source ($\beta_{UV} \simeq 0$), possibly nebular continuum emission leaking from dense ionized gas through a clumpy or porous neutral gas envelope.