

**DRAMATIC VARIABILITY IN A CHANGING-LOOK
BLAZAR, B2 1420+32**

H. D. Mishra

Department of Physics and Astronomy, University of Oklahoma, Norman, OK, USA

E-mail: hora.mishar@ou.edu, xdai@ou.edu

Blazars are active galactic nuclei with their relativistic jets pointing toward the observer, with two major sub-classes, the flat spectrum radio quasars (FSRQ) and BL Lac objects. We present multi-wavelength photometric and spectroscopic monitoring observations of the blazar, B2 1420+32, focusing on its outbursts in 2018-2020. Multi-epoch observations show that the blazar exhibited large scale spectral variability in both its continuum and line emission, as well as dramatic gamma-ray and optical variability by factors of up to 40 and 15, respectively, on week to month timescales. Over a period of 15 years, the gamma-ray and optical fluxes increased by factors of 1500 and 100, respectively.

B2 1420+32 was an FSRQ with broad emission lines in 1995. It transitioned between BL Lac and FSRQ states multiple times, with the emergence of a strong Fe pseudo continuum after multiple flares were observed starting in December 2017. Two spectra also contain components that can be modeled as single-temperature black bodies of 12,000 and 5,200 K. Such a collection of “changing look” features has never been observed previously in a blazar. Most emission line flux variations, except the Fe continuum, are within a factor of 2–3, and we conclude the transitions between FSRQ and BL Lac classifications are mainly caused by the continuum variability. The large increase in the Fe continuum flux suggests the occurrence of dust sublimation which released more Fe ions in the central engine and an energy transfer from the relativistic jet to sub-relativistic emission components. This study is published in its entirety in the *Astrophysical Journal* and can be found at <https://iopscience.iop.org/article/10.3847/1538-4357/abf63d/pdf>.