XIV Serbian Conference on Spectral Line Shapes in Astrophysics
Bajina Bašta, Serbia, June 19 - 23, 2023
Book of Abstracts, Eds. Luka Č. Popović, Nataša Bon, Edi Bon and Sylvie Sahal-Bréchot

JOINT ANALYSIS OF THE IRON EMISSION IN THE OPTICAL AND NEAR-INFRARED SPECTRUM OF I ZW 1

D. Dias dos Santos[1], S. Panda[2], A. Rodríguez-Ardila[2,1]

[1]Divisão de Astrofísica, Instituto Nacional de Pesquisas Espaciais, São José dos Campos, SP, Brazil
[2]Laboratório Nacional de Astrofísica, Itajubá, MG, Brazil

E-mail: denimara.santos@inpe.br, denimaradias@gmail.com

Constraining the physical conditions of the ionized media in the vicinity of an active supermassive black hole (SMBH) is crucial to understanding how these complex systems operate. Metal emission lines such as iron (Fe) are useful probes to trace the gaseous media's abundance, activity, and evolution in these accreting systems. Among these, the FeII emission has been the focus of many prior studies to investigate the energetics, kinematics, and composition of the broad-emission line region (BELR) from where these emission lines are produced. In this work, for the first time, we present the simultaneous FeII modeling in the optical and near-infrared (NIR) region. We use CLOUDY photoionization code to simulate both spectral regions in the wavelength interval 4000-12000 Å and analyze the results for the available FeII atomic datasets. We compare our model predictions with the observed line intensity ratios for I Zw 1 – a prototypical strong FeII-emitting Active Galactic Nuclei (AGN). This allows putting constraints on the BLR cloud density and metal content that is optimal for the production of the FeII emission by examining a broad parameter space. We will demonstrate the salient and distinct features of the FeII pseudo-continuum in the optical and NIR, and discuss the prominence of FeII emission in highly accreting sources.