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UV ASTRONOMY FROM SPACE: ON THE AGES OF EXO-WORLDS

Abstract

n an epoch when the ever growing number of confirmed exo-worlds (and Edgeworth-Kuiper belt analogs) has reached more than 2000, we are now in an timely position to place our Sun and its progeny in an evolutionary context with respect to other planetary systems. The most fundamental quantity for establishing an evolutionary status of any celestial object is the age. For Sun-like stars the age determination is a very challenging task, as they evolve extremely slowly in the hydrogen burning phase. For some stellar types no significant changes are expected even in a Hubble time (13.7 billion years).

Numerous methods have been devised to derive stellar ages. The most accurate is the so-called isochrone fitting which, however, is not applicable to stars in the field as the majority of exo-planet hosts. To date, the most reliable method for dating stars is that of Gyrochronology, which relies on the fact that stars lose part of their original angular momentum through stellar winds. Because of the dynamo effect, the decrease in rotational velocity also affects the stellar magnetic properties, usually studied through the analyses of emission features formed in the stellar Chromospheres and Coronae. The most used proxy for magnetic studies has been the intensity of ionized calcium lines easily observable from the ground. Nevertheless, these features fail to provide accurate ages for stars with shallow convective layers and for

slow rotators like our Sun. In this context, much more sensitive space-ultraviolet (UV) spectral features have emerged as promising tools to decrease the uncertainties associated with stellar ages.

In our presentation, we will provide recent advances in the determination of stellar ages by using data of different space missions. We will show the use of the intensity Mg II resonance emission doublet (2800 Angstroms) and the UV flux surplus, originated by the chromospheric heating, in the establishment of the relative ages of stars with sub-stellar companions. These analyses are being conducted using data from four major space missions: The International Ultraviolet Explorer (IUE), the Hubble Space Telescope, the Galaxy Evolution Explorer (GALEX), and KEPLER. The need of future UV Space Missions will be elaborated along with a brief description of the World Space Observatory (WSO), the only future large UV-dedicated satellite, planned to be launched in 2020. Mexico, through its Space Agency (AEM), is seeking to formally participate in the WSO.