Z125b Precise Determination of Extinction Correction and Plasma Diagnostics

Toshiya Ueta (Univ. of Denver), Masaaki Otsuka (Okayama Observatory/Kyoto Univ.)

Extinction correction is the quintessence of astronomy. To achieve precision astrophysics in plasma diagnostics and the subsequent abundance analyses, one must perform extinction correction properly before executing any emission line diagnostics. By making use of the mutually dependent relationship between extinction correction and plasma diagnostics, we establish a novel technique to determine the physical conditions of a line-emitting target and the extinction characteristics along the line of sight toward the target simultaneously and self-consistently. This approach is made possible by the exact analytical expressions for the extinction parameters in terms of the emission properties of the target, in conjunction with statistical optimization of the extinction parameters to pinpoint the robust physical conditions of the target. The proposed method is also self-contained, requiring measurements of four H I recombination lines at the very least, especially suited for faint targets such as distant galaxies in the context of the upcoming PFS survey.