Spectropolarization of Synchrotron Radiation in Astrophysics

Wednesday, 13 March 2024 15:40 (5 minutes)

The ratio of the polarized synchrotron emission to the total emission, i.e., the polarization degree, is known to be (p+1)/(p+7/3) or $(\alpha + 1)/(\alpha + 5/3)$, for electrons with a power-law energy distribution of index p, where $\alpha = (p - 1)/2$ is the spectral index. In this article, we first show the limitation of the formula, and then we propose a generalized version of this formula which could serve as a universally applicable formula for estimating the polarization degree.

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Session Classification: Poster

Track Classification: Poster section