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Synchrotron Radiation From Plasmas with Sub-Relativistic Temperatures ALES NECAS, SERGEI PUTVINSKI, DMITRI RYUTOV, PETER YUSHMANOV, Tri Alpha Energy, TAE TEAM TEAM — A simple expression for power radiated by synchrotron radiation from plasmas with electron temperatures between 50 – 200 keV is developed. We shall start by re-deriving [1] a general expression for power radiated in vacuum from an individual cyclotron harmonic. Adding up power radiated from individual harmonics shows an asymptotic approach to the power radiated from all harmonics. In a case of $T_e=50$ keV, summing the first 10 harmonics well represents radiation from all harmonics. However, for $T_e=150$ keV, we require to sum over 60 harmonics to adequately represent the total radiation. This is computationally demanding. What follows is a derivation of a simple expression for high harmonic power radiation in vacuum. It is of interested that this expression proofs to be reasonable even for low harmonic numbers. Next we shall present the derivation of the relativistic frequency spectra. A discussion of cut-off for the electromagnetic O-wave and X-wave follows as well as re-emission of synchrotron radiation. Wave propagation close to perpendicular to B field is assumed. [1] Landau, L.D. and Lifshitz, E.M., *Classical Theory of Fields*, New York: Pergamon Press, 1971. Eq. 74.9

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