PHY 841: Student Composed Questions

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Problem 1 Angular Distribution of Radiation from Relativistic Particles

Suppose you have a linear accelerator in which an electron with velocity $\beta = v/c$ is being accelerated.

a) W.r.t. the direction of $\vec{v}$, find the angle θ_{max} at which the maximum radiation is emitted.

b) Show that for the ultra-relativistic case ($\beta \to 1$), $\theta_{max} \approx \sqrt{\frac{1-\beta}{2}}$

c) Show that for the non-relativistic case ($\beta \to 0$), $\theta_{max} \approx \pi/2$