PH673 - High Energy Astrophysics

Assignment 20 - Nov. 19, 2007 (Optional)

Following Section 6.11.2 of the textbook, provide a detailed mathematical proof of the spectral distribution of synchrotron radiation, leading up to the equation:

$$\frac{dI}{d\omega} = \frac{\sqrt{3}q^3 B}{2\pi mc^2} F(\frac{\omega}{\omega_c}) \tag{1}$$

$$F(x) = x \int_x^\infty K_{5/3}(z)dz \tag{2}$$

where $K_{5/3}$ is the modified Bessel function of order 5/3. Possibly useful resources are my notes, the textbook, the book by Abramowitz and Stegun *Handbook of Mathematical Functions* and the book by Sokolov and Temov *Synchrotron Radiation* (which is hard to find, but you can check out my copy).