

## Light Loss in BCAL Fibers

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Following a conversation with George and Elton yesterday I did a crude estimate of the light loss in the fibers used in the BCAL test run. This is a crude estimate of a more refined calculation being done by the Regina group. Please see the talk presented by George (GlueX-doc-886), in particular his slide 20 that show measurements made with a spectrophotometer looking at transmission vs wavelength for the PolyHiTech Blue Fiber. Similar measurements were made for the SCSF-78 fiber as shown in Figure 1(a) as shown in the Kuraray spec sheets (Elton posted these as GlueX-doc-916). The Kuraray emission plots are for 10, 30, 100 and 300 cm from a UV source exciting the fiber. I digitized these plots and the spectral emission from BCF-12 (from the Bicon spec sheets posted by Elton as GlueX-doc-917). The results are shown in Figure 1(b). The BCF-12 emission spectrum has been normalized to agree with the SCSF-78 spectra at high wavelengths. We are assuming that all these blue fibers have the same response. I convolved these spectra with the XP2020 quantum efficiency (see Figure 1(c)) and integrated the resulting curves from 400 to 560 nm. The resulting integrals as a function of distance are plotted in Figure 1(d) with a fit to  $y(z) = y_0 + a \cdot e^{-bz}$ . To compare with the BCAL beam test configuration, the total yield at the source compared to the end of the module (at 2 m) is 0.39 or a light loss of about 60%.

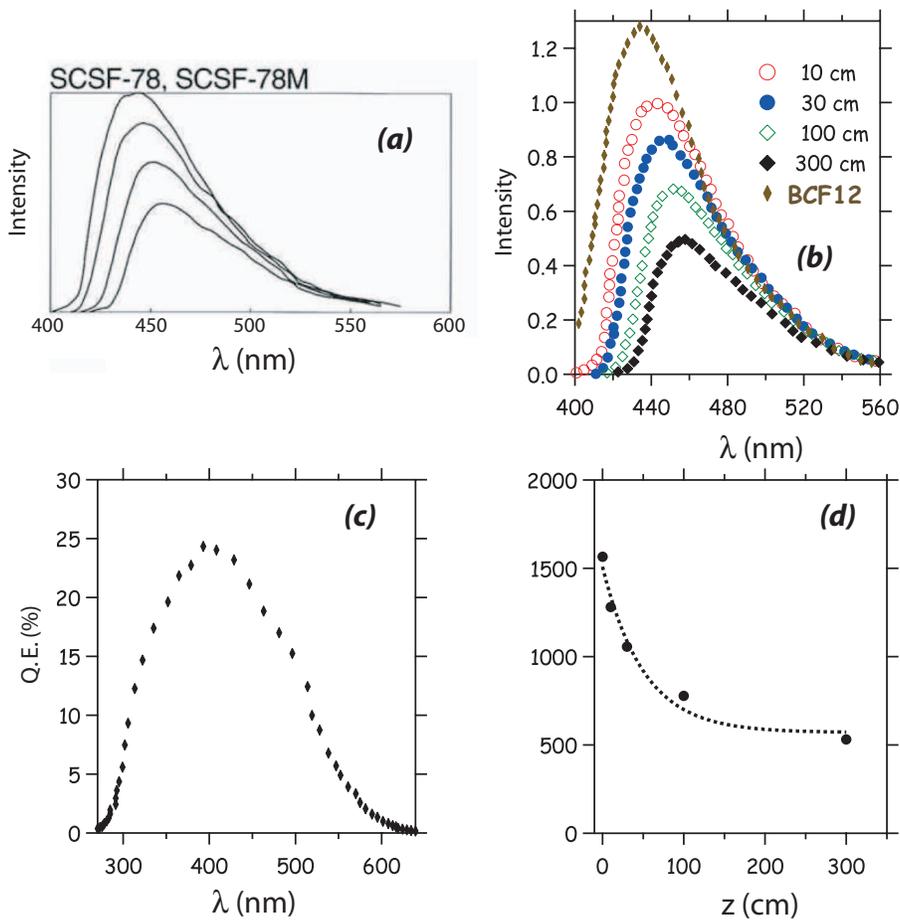


Figure 1: See text for details.