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Wavelength shifting fibers with high photon capture rate

Wavelength-shifting optical fibers are commonly used to collect light from large detector volumes and guide towards photosensors, making them particularly interesting for water Cherenkov or scintillator based detectors. However, one problem is their low photon capture rate, leading to a degradation in the energy resolution of fiber-based detectors.

Building on previous work, it was shown that the photon capture rate can be increased by optimizing the design of the photon absorption zone. In this work, this concept was applied to wavelength shifting fiber to increase the light output of the hybrid opaque scintillator experiment NuDoubt++.

However, the first prototype fibers suffer still from a relative high attenuation, losing this advantage for fiber lengths over 2 meters and losing efficiency compared to commercial fibers. On this poster the further development of the fibers and the effect of adapted production methods on the attenuation length will be shown.

Secondary track

T03 - Neutrino Physics

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