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# Enhanced light collection with a wavelength shifter trap

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The baseline Hyper-K concept relies on 99,000 20"photomultiplier tubes (PMTs) to provide 20% photo-coverage. We are investigating solutions that would enhance the photo-coverage without compromising either contrast or timing resolution. Contrast roughly quantifies the fraction of photons detected that retain the Cerenkov light directional information over the total number of photons detected including photons having scattered, been reflected or reemitted. We are proposing to enclose each PMT within a box allowing direct detection of some of the UV and blue Cerenkov light, while recovering a fraction of the light missing the PMT using a combination of wavelength shifter and dichroic. Simulations shows a factor of 2 to 3 enhancement in photon collection compared to the baseline design. We will show detailed optimization results and the first steps towards building a full scale prototype.

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