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Fighting Gravity on D11

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To use the minimum q of a SANS instrument we require the longest collimation and detector distances combined with the longest wavelength. This combination maximizes how much gravity curves the neutron beam and how much the beam is spread due to the range of wavelengths. D11 is the only gravity limited SANS instrument in the world where at minimum q gravity prevents any transmission through the collimation above a certain wavelength and the beam also falls off the bottom of the detector. To solve these problems initially the use of a prism was employed providing a refracted angle to counter the fall in gravity. This worked in principle but suffered from absorption and scattering from the prism material and was limited to very small beams. Inspired by the horizontal reflectometer FIGARO, a reflective surface of one of the guides in the collimation was found to be able to undo the effects of gravity without the beamsize restriction. Combined with a lens, this allowed a minimum q of 7x$10^{-5} Ang.^{-1}$ to be measured. A scientific example of a system that would profit from this minimum q will be presented.

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