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## The vacuum chamber for the SwissFEL Athos-undulator (UE38)

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The SwissFEL facility will have two undulator lines. The one for hard X-rays, with wavelengths of 7 Å (2keV) to 1 Å (12.4 keV), with an electron energy of 5.8 GeV, is named Aramis. The second one, covering the entire soft X-ray range, from about 200 eV to 2 keV with full polarisation control, is named Athos.

Compared to the in-vacuum Aramis-undulators (U15), the Athos-undulators will have a new design, the so-called APPLE design, where the 4 magnet arrays are out-of-vacuum and can be moved radially in a symmetric way. The minimum gap height is 6.5 mm. To allow this minimum gap the chamber has an inner diameter of 5mm and a wall thickness of 0.2mm (0/+50µm). Since low electrical resistance and best performance in magnetic permeability (optimal  $\mu_r=1$ ) is required, the vacuum chamber is made out of galvanized copper (oxygen free, high conductive).

The paper describes the manufacturing techniques of such a thin walled copper vacuum chamber.

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