



# detector seminar

SPEAKER: Freek Sanders  
TITLE: **Design & Production challenges for the LHCb Velo Upgrade Modules**  
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## ABSTRACT

For the coming upgrade of the LHCb experiment, a new Vertex Locator (VeLo) is needed. This subdetector contains 52 state-of-the-art modules, featuring CO<sub>2</sub> microchannel cooling, high-rate hybrid pixel detectors and cables. It all sits in a high radiation environment with an integrated fluence of up to  $8 \times 10^{15}$  1 MeV neq/cm<sup>2</sup> and high vacuum. This makes designing a module a very complex task, and many obstacles had to be overcome. In this presentation the deformation of the modules will be highlighted, and how we handled these deformations. Building modules is another issue, but equally important. Of course, building high-performance state-of-the-art modules never goes right in one go. The whole assembly process will be discussed, going in depth into the problems that have arisen during the preparation for production. To conclude the talk, insights will be given on technologies and the experience gained that may prove useful for future upgrades of the LHCb detector or other experiments.