

Cooling Project for a Possible High-Eta Muon Detector

Cooling Project (part-time)

In order to test the feasibility of [extending ATLAS muon coverage](#), from the present maximum eta of 2.7 to as much as 4.5, with pixel detectors in the gap between the endcap calorimeter and the muon Small Wheel, we plan to install several pixel modules in this location during Long Shutdown 1 and gain operational experience in Run-2. The modules require cooling. This project is to investigate several options to find one that is most appropriate for this application: robust, easy to install and operate, small, and posing no danger to nearby equipment such as the beam pipe.

We plan to install two modules each of three kinds of pixel detectors: planar, 3D and diamond. The first two are expected to be spares from IBL, while the third will come from DBM. The heat load per module is less than 2W, so the total heat load is approximately 10W.

Two approaches to cooling have been discussed so far: Peltier junction and vortex tube. Other approaches will be added when they are identified. A person working on this project can expect to participate in setting up tests, operating the devices and understanding the operational parameter space. The final outcome should be recommendations to use (or not use) specific cooling devices in the feasibility test.