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## SiPMs characteristics after very high Radiation at low Temperature for the SLHC CMS PHASE II upgrade

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The design of the CMS phase II upgrade for the SHLC uses SiPMs for the Barrel Timing Layer (BTL) and the Behind HCAL detector (BH). In both sub-detectors the SiPMs will see a 1 MeV Equivalent dose of around  $10E14$  n/cm<sup>2</sup>. To lower the noise in the SiPMs the design is to run at a low temperature of -30C .

Different samples from two manufactures of SiPMs were radiated up to a very high total dose of  $4*10E14$  at the TRIGA reactor at the JSI in Slovenia.

We compare samples of 4 different wafers with different internal electric field from FBK-irst (Italy). We study the noise vs temperature down to -40C after different irradiations. We also report on PDE change and break-down voltage shifts after the highest neutron doses.

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