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Neutrino generated radiation from a high energy muon collider

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Muons circulating in a muon collider decay and generate neutrinos within a small solid angle, which reach the earth's surface. One of the challenges of a high energy muon collider is to ensure that showers created by such neutrinos interacting close to the earth's surface result in very low radiation levels. The neutrino radiation cone from a muon beam without divergence is estimated through a combination of analytical estimates and FLUKA simulations. Such neutrino cones have to be combined with the properties of the lattice to obtain the possible radiation levels at the earth's surface. Studies of mitigation measures will be presented, combining the installation of the collider deep underground with a careful choice of the orientation, and with periodic variations of the muon beam trajectory either within the machine aperture or by deforming the whole machine in the vertical plane.

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Footnotes

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Yes

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