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Gas Filled RF Resonator Hadron Beam Monitor for Intense Neutrino Beam Experiments

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MW-class beam facilities are being considered all over the world to produce an intense neutrino beam for fundamental particle physics experiments. A radiation-robust beam monitor system is required to diagnose the primary and secondary beam qualities in high-radiation environments. We have proposed a novel gas-filled RF-resonator hadron beam monitor in which charged particles passing through the resonator produce ionized plasma that changes the permittivity of the gas. The sensitivity of the monitor has been evaluated in numerical simulation. A signal manipulation algorithm has been designed. A prototype system will be constructed and tested by using a proton beam at the MuCool Test Area at Fermilab.

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