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High-gradient accelerating structures for proton radiography booster linac

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Increasing energy of proton beam at the Los Alamos Neutron Science Center (LANSCE) from 800 MeV to 3 GeV will improve radiography resolution ten-fold. This energy boost can be achieved with a compact cost-effective linac based on normal conducting high-gradient (HG) RF accelerating structures. Such an unusual booster is feasible for proton radiography (pRad), which operates with short beam pulses at very low duty. The pRad booster starts with a short L-band section to capture and compress the 800-MeV proton beam from the existing linac. The main HG linac is based on S- and C-band cavities. An L-band de-buncher at the booster end reduces the beam energy spread at 3 GeV three times below that at the exit of the existing 800-MeV linac. We continue developing proton HG standing-wave structures with distributed RF coupling for the booster. Results of measurements for a two-cell test cavity at the LANL C-band RF Test Stand and a comparison with conventional traveling-wave structures are presented.

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Footnotes

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