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High-Gradient 3 GeV Booster for Enhanced Proton Radiography at LANSCE

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Increasing the proton beam energy from the present 800 MeV to 3 GeV will improve the resolution of the Proton Radiography Facility at the Los Alamos Neutron Science Center (LANSCE) by a factor of 10. It will bridge the gap between the existing facilities, which covers large length scales for thick objects, and future high-brightness light sources, which can provide the finest resolution. Proton radiography requires a sequence of short beam pulses ($\sim 20 \times 80$ ns) separated by intervals of variable duration, from about 200 ns to 1-2 μ s. To achieve the required parameters, the high-gradient 3-GeV booster is proposed. Utilization of buncher-accelerator-debuncher scheme allows us to combine high-gradient acceleration with a significant reduction of beam momentum spread. Paper discusses details of linac design and expected beam parameters.

Acknowledgments

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