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Positron Beam Steering via Planar Channeling and Volume Reflection with Silicon Crystals at MAMI

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Using a 530 MeV positron beam from the Mainz Microtron MAMI and a bent silicon crystal, we successfully manipulated positron trajectories through planar channeling and volume reflection. This experiment revealed detailed structures in the angular distribution of channeled charged particles within bent crystal planes. Our findings align with simulations, enhancing our understanding of interactions between charged beams and bent crystals. This research advances methodologies for slow extraction in GeV range circular accelerators. Additionally, it contributes to the development of advanced x-ray sources via channeling in periodically bent crystals, demonstrating significant progress in the field.

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