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Silicon crystals for steering of high-intensity particle beams at ultra-high energy accelerators

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Simulation models and worldwide experimental campaigns shows that coherent interactions between charged particle beam and crystals can be exploited at high-intensity particle beams at ultra-high energy accelerators for efficient particle beam steering. Indeed, a properly shaped tiny silicon crystal can deliver the same steering effect which would be delivered by a multi hundred Tesla dipole. As a result, crystals might play a relevant role for the development of new generations of high-energy and high-intensity particle accelerators, and might disclose innovative possibilities at existing ones. We describe the most advanced manufacturing techniques of crystals suitable for operations at ultra-high energy and ultra-high intensity particle accelerators.

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