

Chiral Belle Conceptual Design Report: Upgrading SuperKEKB with a Polarized Electron Beam

Belle II Collaboration

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Status of Sections

- Physics – written, but needs updating with recent theory papers
 - Characterizing Dark Bosons at Chiral Belle [C.H. de Lima, D. McKeen, A. Omar, D. Tuckler, [2507.15931](#) [hep-ph] 2025]
 - Complete one-loop result for the fully polarized $e^+e^- \rightarrow \tau^+\tau^-$ process and its implementation in the Monte-Carlo integrator McMule [Martin Hoferichter and Yannick Ulrich J. High Energ. Phys. **2025** 172 (2025)]
 - A_{LR} in polarized Bhabha scatter (C. Miller, M. Roney)
 - Characterizing Dark Bosons at Chiral Belle
- Compton polarimetry – good shape, needs more on electron detector
- Spin rotator text – needs updating with recent studies and update on prototype R&D planning
- Source text – needs updating with recent studies
- Write material on planning – e.g. potential timelines etc