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Beam Breakup Studies for the C^3 Linear Collider

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High luminosity electron-positron linear colliders constitute a fundamental instrument in the field of elementary particle physics. The "Cool copper collider", or C^3, is a proposal for a 250 COM GeV Higgs factory, with possible extension to the TeV-scale, and it represents a promising candidate for the near future high energy physics. The C^3 infrastructure is conceived as a modular facility utilizing cryogenic, distributed coupling standing wave accelerating sections. Although the acceleration process is optimized by the high shunt impedance, such structures are also accompanied by stronger wakefield effects due to the smaller irises. The transport of intense beams is thus endangered by beam break-up effects responsible for emittance dilution and unstable motion. Here we utilize the tracking code MILES to study both long and short-range beam breakup effects in distributed coupling structures as well as their mitigation. In addition, we initiate the investigation of configurations alternative to the standard standing wave π-mode phase advance which offer advantages in both the RF power distribution and efficiency.

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