

Luminosity of Colliding Crystalline Beams*,
J. WEI, BNL; A.M. SESSLER, LBL - The understanding of crystalline beams has advanced to the point where one can now, with reasonable confidence, undertake an analysis of the luminosity of colliding crystalline beams. Such a study is reported on here. It is necessary to observe the criteria, as previously stated, [1] for the creation and stability of crystalline beams. This requires, firstly, the proper design of a lattice (such is not the case for the lattices of all present colliders); secondly, the formation of crystal at various densities; and thirdly, the collision of crystals in a colliding beam machine. We study all of these processes using the molecular dynamics methods. The work continues from what was done previously [1] with the study of crystal-crystal interaction on collision. Compared with conventional colliding beams, it is seen that the crystalline beams can tolerate much larger beam-beam tune shift. Consequently, the luminosity is greatly enhanced.

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[1] J. Wei, X-P. Li, A.M. Sessler, Phys. Rev. Lett., 73, 3089 (1994).