

Calculation of Collective Effects and Beam Lifetimes for the LBL 1-2 GeV Synchrotron Radiation Source, S. CHATTOPADHYAY and M.S. ZISMAN,* Lawrence Berkeley Laboratory - In designing a third-generation high brightness synchrotron radiation source, attention must be paid to the various collective effects that can influence beam performance. We report on calculations, performed with the code ZAP¹, of the bunch length, the transverse emittance, and the beam lifetime (from both Touschek and gas scattering) for our 1-2 GeV storage ring. In addition, we estimate the growth times for both longitudinal and transverse coupled-bunch instabilities. Bunch lengths of about 20 ps should be obtainable and IBS emittance growth is small. For a limiting gap of 1 cm and $P = 1$ nTorr, the beam lifetime is about 5 hours in the single-bunch mode; in the multibunch mode, lifetimes in excess of 6 hours are expected. These results indicate that all performance goals for the facility should be achievable.

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