Characterizing collective spontaneous emission in simple geometries YI LI, JUHA JAVANAINEN, U. of Connecticut — Under suitable conditions, notably the absence of saturation, the collective response of atoms to light may be simulated numerically, in principle exactly, by applying classical electromagnetism to a medium of model atoms with a dipole moment linear in the driving light. In spite of being entirely classical, such an analysis correctly accounts for collective spontaneous emission in the atomic sample. We report on quantitative characterization of spontaneous emission in atomic samples with simple geometries such as a spherically symmetric Gaussian cloud and a two-dimensional sheet. Collective effects are seen at unexpectedly low atom densities, with $n(\lambda/2\pi)^3 \ll 1$.

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