Anisotropy of π-plasmon Dispersion Relation of AA-stacked Graphite C.W. CHIU, Department of Physics, National Cheng Kung University, Tainan 710, Taiwan, F.L. SHYU, Department of Physics, R.O.C. Military Academy, Kaohsiung 830, Taiwan, M.F. LIN, Department of Physics, National Cheng Kung University, Tainan 710, Taiwan, GODFREY GUMBS, OLEKSIY ROSLYAK, Department of Physics and Astronomy, Hunter College at the City University of New York, 695 Park Avenue New York, NY 10065 USA — The dispersion relation of optical π-plasmons of simple hexagonal intrinsic graphite was calculated within the self-consistent-field approximation. The plasmon frequency ω_p is determined as functions of the wave vector $\mathbf{q}_\parallel$ along the hexagonal plane in the Brillouin zone and its perpendicular component q_z. These plasmons are isotropic within the plane in the long wavelength limit. As the in-plane wave vector is increased, the plasmon frequency strongly depends on its magnitude and direction (ϕ). Our results reveal that interlayer interaction could enhance anisotropy of in-plane π-plasmons. The group velocity for plasmon propagation along the perpendicular direction may be positive or negative depending on the choice of in-plane wave vector.

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