NOTE ON "OSCILLATIONS IN IONIZED GASES"

By Lewi Tonks and Irving Langmuir

Certain general equations governing plasma-electron oscillations were derived on pages 197 and 198 of the article "Oscillations in Ionized Gases."[1] Only when it was too late to add a note to this article did we realize that certain approximations beyond those specifically mentioned in the paper were involved. The first such approximation occurs in the elimination of $\mathbf{v}$ by taking the time derivative of the third electromagnetic equation. The terms $\dot{n}e\mathbf{v}$ and $ne\dot{\mathbf{v}}$ both appear. For sufficiently small oscillations the former can be neglected since it varies as the square of the oscillation amplitude while the latter is proportional to the first power. Later, a similar situation arises with the occurrence of the term $(4\pi e^2/m)\mathbf{E}\cdot\nabla n$ in passing from Eq. (5B) to (5C). If ∇n arises wholly from the oscillation, this term can be neglected on the same grounds, but if n has a fixed space variation other effects which have not yet been investigated may arise.

[1] Tonks and Langmuir, Phys. Rev. **33**, 195 (1929).