

Abstract Submitted
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Holes in Hall Effect LIANXI MA, Blinn College, TEXAS A&M UNIVERSITY TEAM — Hall Effect can be used to determine the signs of current carriers in metals and semiconductors. It is well known that when electrons are current carriers, the Hall coefficient is negative, i.e. $R_H < 0$; when holes are current carriers, the Hall coefficient is positive, i.e. $R_H > 0$. However, puzzling arises regarding that in both scenarios, the essential moving particles are electrons. Therefore, there should not have any different effect in theory. We discuss the details about two situations and point out that both quantum and classical mechanics give same current direction under external electric field. However, under the influence of external magnetic field, because the mass of electrons is negative at valence band, electrons move to the opposite direction of its Lorentz force, which behave like a positive charge and give positive R_H .

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