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Electrostatic effects and topological superconductivity in semiconductor-superconductor-magnetic insulator hybrid wires[1] BENJAMIN WOODS[2], West Virginia University — We investigate the impact of electrostatics on the proximity effect between a magnetic insulator and a semiconductor wire in semiconductor-superconductor-magnetic insulator hybrid structures. By performing self-consistent Schrodinger-Poisson calculations using an effective model of the hybrid system, we find that large effective Zeeman fields consistent with the emergence of topological superconductivity emerge within a large parameter window in wires with overlapping layers of magnetic insulator and superconductor, but not in non-overlapping structures. We show that this behavior is essentially the result of electrostatic effects determining the amplitude of the low-energy wave functions near the semiconductor-magnetic insulator interface.

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[2]Tudor D. Stanescu is also an author on the corresponding paper.

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