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Fano-Feshbach resonances in multigap superconductors near electronic topological transitions.[1] ANTONIO BIANCONI, RICMASS, Rome Int. Center for Materials Science Superstripes — The unconventional superconductivity where the chemical potential is tuned near electronic topological transitions, Lifshitz transitions, in multiband systems was first proposed for striped textures in cuprate perovskites. This scenario is emerges in a large variety of superconducting heterostructures made of nanowires and atomic chains. Near a Lifshitz transition a strongly interacting electron fluid shows a complex phase separation characterized by lattice, spin and charge inhomogeneity from atomic to mesoscale range. Here we discuss experimental and theoretical features of this scenario in iron based superconductors and pressurized sulfur hydride. In sulfur hydride by increasing pressure above 120 GPa the chemical potential is tuned to the electronic topological Lifshitz transition for the appearing of a new Fermi surface pocket at Gamma. We discuss the physics of a Fano-Feshbach resonance triggering unconventional multigap superconductivity in this scenario. This is characterized by pressure dependent isotope effect.and anti-resonance giving a suppression of the critical temperature if the pairing in the appearing Fermi surface is in the BEC regime while the maximum critical temperature appears where the pairing in the appearing Fermi surface is in the BCS-BEC regime.

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