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## Renaissance Fusion: Nuclear fusion concept and tritium related issues

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The European startup Renaissance Fusion synergistically combines three main pillars: the stellarator, High Temperature Superconductors (HTS) and liquid metal walls. For simpler coil manufacturing, Renaissance is building machines to directly deposit HTS on large 2D surfaces. Engraving imposes specific current-patterns that generate specific 3D magnetic fields. Plasma-facing, liquid metal walls will be thick enough to shield structural materials and delicate HTS from fusion neutrons, yet not too thick, thanks to neutron-attenuating hydrides. The walls will flow, hence extract heat, and will contain lithium, hence breed tritium. Experiments are well on track to prove thick, free-surface liquid metal flows adhering to the interior of cylindrical chambers by means of electromagnetic and centrifugal forces, initially without plasmas. For initial experiments, the dense GaInSn alloy is being used, at room temperature. This will give confidence on the ability to sustain and stabilize flows of lighter fluids. Subsequently, we will adopt lighter, fusion-relevant materials and temperatures. A remarkably simple tritide extraction technique will be presented, based on phase transitions in solutions of lithium with its hydrides. Research needs, job openings and areas of possible collaboration will also be discussed.

**Author:** VOLPE, Francesco (Renaissance Fusion)

**Presenter:** VOLPE, Francesco (Renaissance Fusion)

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