

Abstract Submitted  
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**Ignited Spherical Tokamaks and their super-critical regime<sup>1</sup>**

LEONID ZAKHAROV, Princeton University, PPPL — The LiWall concept, which is now completed, and based on it Ignited Spherical Tokamaks (IST) for developing a fusion power reactor is outlined. With a central fueling of the plasma by the neutral beam injection and with pumping boundary conditions the temperature profiles inside the plasma will be automatically flattened, thus eliminating the major channel of energy loss due to the ion-temperature gradient instability. Such a property would change the entire approach to tokamak magnetic fusion and make it consistent with the power reactor development. The self-consistency of the LiWall concept (only 7 years old) and resulting IST, in terms of stability (both internal and free-boundary), confinement, high power density, fueling, external control of the density and bootstrap current, and power extraction is discussed. The unique combination of the small size of IST, large Shafranov shift and a good confinement exceeding what is necessary for ignition would constitute a new, super-critical ignition (SCI) regime, which significantly simplifies the physics and the design of IST and the way to the power reactor.

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