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P4.1094 Physics aspects of the COMPASS Upgrade tokamak

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Recently, the construction of the COMPASS-U tokamak, a medium-size (R = 0.894 m; a = 0.27 m), high-magnetic-field (5 T) device, has started in the Institute of Plasma Physics of the Czech Academy of Sciences in Prague, Czech Republic. COMPASS-U will be capable to operate with plasma current up to 2 MA and, therefore, also at high plasma densities (~1020 m-3). The device is designed to generate and test various DEMO relevant magnetic configurations, such as conventional single null, double null, and snow-flake; it will be also capable to operate with hot walls (up to 500℃). The plasma will be heated using 4 MW Neutral Beam Injection (NBI) heating system with future extension by at least 4 MW Electron Cyclotron Resonant Heating (ECRH). COMPASS-U aims at addressing the knowledge gaps associated with the plasma operation at the high magnetic field and related areas of the plasma and energy exhaust. The device will focus on the open physics questions such as the demonstration of detached operation at ITER/DEMO relevant heat fluxes, studies of enhanced confinement modes (QH-, I- and EDA-modes), and integrated core-edge scenarios. The design of the divertor will allow to test both the conventional materials as well as liquid metal technologies under high heat fluxes. Conventional materials will be used during the first stage of operation. In the later phase, a conventional upper divertor will be installed and liquid metal materials will be used in the bottom divertor. In this contribution, the focus of the COMPASS-U tokamak and its physics goals will be presented. The reference operational scenarios and relevant key plasma parameters will be shown.

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