



The PPPL Highlights for the week ending October 12, 2019 are as follows:

NSTX-U RECOVERY (J. GALAYDA) AND RESEARCH (S. KAYE)

Recovery (J. Galayda):

VVHW Recovery Field Scope PDR-2 — A successful second preliminary design review (PDR-2) was held on Oct. 10 to review detailed inspection results and design improvements, and to address the remaining Design Verification and Validation Review (DVVR) chits related to ex-VV components. A PDR-1 was held on Feb. 1, 2018, that addressed chits from the DVVR and the Extent of Condition Design review that included significant design improvements to the coil terminal supports.

Critical Procurements — The project team is working closely with the PPPL Procurement department on the acquisition of parts and services that are on or near critical path. These include machine core structures and plasma-facing components. In parallel with this effort, the team is working closely with the PPPL shops on the fabrication of the parts needed to modify passive plates.

ITER & TOKAMAKS (R. NAZIKIAN)

DIII-D (B. Grierson):

Research:

S. Haskey and F. Laggner participated in the 17th International Workshop on H-mode Physics and Transport Barriers (HMWS 2019) in Shanghai, China. F. Laggner's contribution, titled "Inter-ELM pedestal structure evolution in DIII-D — Linking clamping of edge gradients to saturation of pedestal localized instabilities," found that the sequence of the pedestal gradient evolution is robustly consistent for the explored parameter ranges in heating power, heating mix, and net input torque. The ELM repetition frequency is mainly determined by the last phase of the pedestal evolution with saturated pressure gradient. Here, the edge gradients are clamped but marginally stable such that ELMs can but not necessarily need to appear immediately. S. Haskey's presentation, titled "Comparison of main-ion thermal transport and poloidal rotation to neoclassical theory in the H-mode pedestal on DIII-D," utilizes main-ion, impurity, and electron measurements to calculate both the main-ion poloidal rotation leading up to and across the L-H transition and the ion heat flux in the pedestal region. It is found that the poloidal rotation of the main ions is significantly larger than estimates from neoclassical theory and the ion heat flux is also larger than the local neoclassical value at low collisionality and within a factor of two at higher collisionality.

Weekly

HIGHLIGHTS



G. Kramer visited DIII-D in San Diego, California, to take part in Alfvén eigenmode experiments and collaborate with a number of DIII-D colleagues on various topics ranging from ELM stability to ECE-I imaging.

International PMI and FES LM PFC Development Program (R. Maingi):

A. Diallo, R. Maingi, and Z. Sun attended the H-mode workshop and presented the following papers: “ELM suppression by real-time boron powder injection in tungsten divertor in EAST,” (Diallo, et al.); “Comparison of active boron and lithium particle injection on ELM stabilization and plasma performance on EAST with tungsten divertor,” (Sun, et al.); and “ELM trigger with lithium granule injection based on ELM-absent H-mode in EAST,” (Sun, et al.). R. Maingi served on the International Advisory Committee of the H-mode workshop and chaired a session.

ITER-JET (M. Podestà, F. Poli):

A. Teplukhina visited JET Sept. 30 to Oct. 11. She presented and discussed recent TRANSP simulations of ICRF-NBI synergistic effects in JET plasmas with the EUROfusion M18-11 task working group. A few suggestions on improvement of the interpretative TRANSP studies were pointed out, in particular including additional JET plasma discharges to cover lack of diagnostic data in the analyzed one. She worked with the OMFIT/TRANSP group at JET to learn and test a new feature to couple the kinetic equilibrium code EFIT++ with TRANSP pressure profiles. That work is in progress and will help to take into account the contribution of fast ions to plasma equilibrium.

P. Bonfiglio visited JET Sept. 23 to Oct. 11 to work on the KA2 Faraday Cups diagnostics and participate to activities on energetic particle studies within the PPPL/JET collaboration. Bonfiglio discussed plans for the development of a synthetic diagnostic for the interpretation of KA2 measurements and possible hardware upgrades to the system in view of the DT experimental campaign. He also reviewed with JET colleagues his APS-DPP 2019 poster on recent results from the KA2 system.

KSTAR Stability (M. Podestà):

K. Erickson (PPPL), S. Sabbagh (Columbia University), and co-workers from PPPL, Columbia University, and NFRI (South Korea) successfully completed the connection of magnetic probe signals from KSTAR to the real-time MHD analysis system. Initial tests performed during the calibration of magnetics’ signals passed all requirements included in the test procedure. This represents a critical milestone within the ongoing international collaboration with KSTAR to demonstrate acquisition in real time of



Mirnov coil signals that will be used for the development of real-time strategies for disruption prevention and avoidance.

ADVANCED PROJECTS (D. GATES)

Stellarators (D. Gates):

C. Zhu visited the Courant Institute of Mathematical Sciences at New York University on Oct. 7 and 8. He presented a seminar titled, "Direct identification of important coil deviations to avoid error fields using the Hessian matrix method," at the Magneto-Fluid Dynamics Seminar. In his seminar, Zhu introduced using the Hessian matrix to directly identify important coil deviations for controlling error fields. He also had fruitful discussions with NYU colleagues on singularities in boundary integral equations and nonlinear optimizations in stellarator designs.

THEORY (S. HUDSON)

H. Mynick presented a poster titled, "Constraining stellarator optimization to the quasisymmetric subspace with QSC," at the 22nd International Stellarator and Heliotron Workshop in Madison, Wisconsin.

COMMUNICATIONS & PUBLIC OUTREACH (A. ZWICKER)

Communications (L. Bernard):

The Office of Communications posted two news stories to the PPPL website. One focused on research led by D. Battaglia into constructing a simulation framework for developing and testing the plasma start-up recipes for NSTX-U and MAST-U. Another story described the launch of the Traverse supercomputer at Princeton University, which PPPL scientists will use for development of fusion. The stories were posted to the Newswise and EurekAlert press release distribution services.

DIRECTOR'S OFFICE (S. COWLEY)

On Oct. 10 and 11, J. Menard participated in the CFETR Physics IAC meeting and, on Oct. 13, he participated in the International Fusion Energy Collaboration Conference (IFEC). Both meetings were held in Hefei, China.

On Oct. 10 and 11, M. Zarnstorff participated in the National Laboratory Day at the University of Toledo, Ohio.

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