The JET collaboration

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The DOE-funded era of the JET Collaboration has successfully come to an end in 2015. The JET collaboration (Topical Collaboration on Jet and Electromagnetic Tomography of Extreme Phases of Matter in Heavy-ion Collisions) was founded in 2009 with initially 16 PIs. 2 PIs were added later, hired in junior faculty positions partially supported by JET. Columbia University, Duke University, Kent State University, Lawrence Berkeley National Laboratory, Lawrence Livermore National Laboratory, Los Alamos National Laboratory, McGill University, Ohio State University, Purdue University, Texas A&M University, University of Colorado, and Wayne State were participating institutions. Che-Ming Ko and Rainer J. Fries at the Texas A&M Cyclotron Institute were among the 16 original PIs of the collaboration.

In 2010 JET was selected as one of 3 topical collaborations in nuclear theory in the first round of solicitations for these new funding instruments. DOE provided funds for postdoc and students, collaboration travel, bridging funds for two junior faculty positions, and support for an annual summer school. At the Cyclotron Institute Kyong Chol Han received his Ph.D. in 2016 on a topic that is directly related to the JET collaboration mission.

Members of the JET collaboration worked on many aspects of hard and electromagnetic probes in high-energy nuclear collisions. A list of publications and other related information can be found on the collaboration wiki page [1]. Particularly noteworthy are three efforts that were milestone achievements of the collaboration.

1. The collaboration published an integrated package (iEBE) for event-by-event viscous hydrodynamic and hadron cascade hybrid model simulations for relativistic heavy-ion collisions. The package is publicly available and allows users to run simulations of the bulk of high energy nuclear collisions.
2. The collaboration extracted the best known value of the jet quenching parameter $\hat{q}$ from leading hadron observables comparing various perturbative calculations of jet quenching with experimental data. The result is $\hat{q} = 1.2 \pm 0.3$ GeV^2/fm for 10 GeV quark jets at a temperature around 370 MeV [2].
3. The collaboration constructed all modules needed for a comprehensive in-medium jet shower Monte Carlo (MC). Two parton shower MCs (the Berkeley-Wuhan MC and MATTER++) are now available. The Cyclotron Institute developed a universal hadronization model for jets in vacuum and in medium based on quark recombination and string fragmentation [3].

The DOE-funded era of the JET collaboration and its achievements were celebrated with the entire high energy nuclear physics community at a symposium at McGill University in June 2015, held before the Hard Probes 2015 conference. The JET collaboration will continue its work past its status as a DOE topical collaboration.

[1] http://jetwiki.lbl.gov
[2] Karen M. Burke *et al.*, Phys. Rev. C **90**, 014909 (2014).
[3] Kyong Chol Han, Rainer J. Fries, and Che Ming Ko, Phys. Rev. C **93**, 045207 (2016).