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RE: Exit Report: FUSTIPEN visit to GANIL by Dr. Bruce R. Barrett, March 12-20, 2016

Dr. Robert Janssens
Co-Director: FUSTIPEN
Argonne National Laboratory

Dear Robert,

This is my exit report on my FUSTIPEN visit to GANIL from March 12-20, 2016. I flew from Tucson to Paris on March 12-13 and then took a train from Paris to Caen. My collaborative research actually began on the train, because Prof. Bira van Kolck (Orsay/U. AZ) and Dr. Ionel Stetcu (LANL) were travelling with me. We discussed a joint project on the application of the pionless Effective Field Theory formalism to the four neutron problem, *i.e.*, can four neutrons form a bound state

At GANIL, Marek Ploszajczak and I were co-organizers for the FUSTIPEN Topical Meeting on *Future Directions for Nuclear Structure and Reaction Theories: Ab initio Approaches for 2020* from March 14 to 18, 2016. This meeting was attended by 34 nuclear physicists, both theorists (the majority) and experimentalists from 13 countries. There was a maximum of only six talks per day, related to a daily topic, such as new developments in many-body techniques for calculating nuclear structure, *etc.* Consequently, there was plenty of time available for questions and discussions after each talk and in the wrap-up session at the end of the talks for each day. This format was extremely popular with the participants, who enthusiastically took part in these discussions. Besides the many interesting and informative research talks, the meeting also met the FUSTIPEN goal of stimulating existing and encouraging new collaborations. In particular, I started a new collaboration with Prof. Heiko Hergert (MSU), regarding the A-dependence of the core and single-particle energy terms, calculated microscopically for use in standard shell-model (SSM) investigations, using the IM-SRG formalism and the NCSM with a Core approach. More than one way exists for calculating these terms, which then have different A-dependencies, which we want to understand. Professor Nadya Smirnova from the University of Bordeaux travelled to Caen on March 15-16 to talk with Prof. James Vary (Iowa State U) and me about starting a new collaboration, regarding the microscopic input for SSM calculations. I also had discussions with Marek regarding the No Core Gamow Shell Model and possible future applications, such as the $A = 4$ isobars and the isotopes of H.

To summarize, my FUSTIPEN visit to GANIL was highly successful, first, in starting new collaborations and stimulating existing ones and, second, in producing a highly informative and productive Topical Meeting on the present status of and future directions for *ab initio* nuclear structure and reaction theories. I hope that we will be able to continue these collaborative interactions and very successful topical workshops in the future.

With best regards,
Bruce
Bruce R. Barrett