Snowmass 2021 LOI on H —> invisible

In the context of Snowmass 2021, we intend to study the prospects for H —> invisible searches at future colliders. There are two aspects to our proposal. First, we aim to use H —> invisible results at the LHC [1, 2] to do projections of H —> invisible searches at future colliders. If other groups are interested in similar topics, we will collaborate and consider more detailed studies provided person-power and simulated data are available. The second aspect of our proposal is particular to the ILC; specifically for the ILC, we propose to use the production process ZH with Z —> jj and H —> invisible. If centrally produced samples are available, we will do more detailed feasibility studies. In the two cases proposed, we will do interpretations in the Higgs portal–dark matter (DM) model to derive limits on the DM-nucleon scattering cross section.

Kétévi A. Assamagan (BNL), Diallo Boye (BNL), Simon Connell (University of Johannesburg), Scott Snyder (BNL), Loan Truong (University of Johannesburg), Christian Weber (BNL)

[1] ATLAS Collaboration, https://cds.cern.ch/record/2715447
[2] CMS Collaboration, https://indico.cern.ch/event/858855/contributions/3863198/attachments/2048865/3433925/S-channel_DM.pdf