

Drilling for the Radio Neutrino Observatory in Greenland (RNO-G): field performance of BigRAID

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The Radio Neutrino Observatory in Greenland (RNO-G) is designed to detect ultra-high-energy neutrinos by capturing the radio signals generated when these rare particles interact with glacial ice. Located near Summit Station on the Greenland ice sheet, RNO-G will ultimately consist of 35 autonomous stations, each spaced 1.25 km apart and equipped with arrays of in-ice antennas. A key component of each station is a set of three subsurface strings of antennas, which require boreholes approximately 100 meters deep and wider than 6 inches in diameter. Construction of the observatory began in 2021, and eight stations have been deployed to date. To meet the drilling requirements, the project utilizes the BigRAID system. Developed through a collaboration between the University of Wisconsin–Madison, the British Antarctic Survey (BAS), and the RNO-G team, BigRAID is being continually refined to improve its reliability, enhance drilling speed, and incorporate advanced automation and control software. This presentation will review recent upgrades to the drill and assess its performance in the field through the four seasons of drilling.

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