Abstract Submitted
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Pulsed Proton Beam from an ECR Ion Source[1] MATTHEW Q. BUCKNER, UNC-Chapel Hill and TUNL, BRET P. CARLIN, Duke University and TUNL, JOHN M. CESARATTO, THOMAS B. CLEGG, UNC-Chapel Hill and TUNL — A remote, LabView-controlled circuit producing variable beam pulse widths and periods has been implemented for an electron-cyclotron-resonance (ECR) ion source at TUNL's Laboratory for Experimental Nuclear Astrophysics. The pulsed signal programs high voltage power supplies of the ECR source's beam extraction system. Because the Coulomb barrier lowers the rate for very-low-energy nuclear reactions of astrophysical significance, and environmental and cosmic-ray backgrounds often dominate the signal, pulsed beam can reduce these backgrounds. Increasing the beam intensity by a factor of 10 and pulsing the beam with a 10% duty factor (i.e. 100 ms on and 900 ms off), leaves the average target current unchanged. By gating detector electronics on only during the pulse, 90% of environmental and cosmic-ray backgrounds are suppressed. The pulsing circuit utilizes a 555 timer to produce a pulse, and digital potentiometers to adjust the pulse width and period remotely. Relays allow the ECR source operator to switch between a constant DC beam and a pulsed beam.

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