

Isotope R&D

Nov 30, 2018

JLab/NMT/VCU

<http://>

Project manager

Project dates

Jul 2, 2018 - May 29, 2020

Completion

19%

Tasks

51

Resources

8

Isotope Production R&D at Jefferson Lab's High-Power Electron Accelerators

Tasks

Name	Begin date	End date
Isotope Project	7/2/18	5/28/20
Planning	7/2/18	11/30/18
Prepare Schedule	7/2/18	9/28/18
Prepare budget	7/2/18	11/30/18
M1 Project Activities and Schedule Defined	10/1/18	10/1/18
M2 Detailed Budget Established	11/30/18	11/30/18
M3 NMT student selected	10/31/18	10/31/18
Prepare optics deck	7/2/18	10/15/18
Plan LERF installation between cryomodule and dump	9/18/18	11/15/18
Plan target beamline installation	9/18/18	12/21/18
M4 Complete LERF Installation Planning, Optics Deck Approved	12/21/18	12/21/18
Install LERF beamline between cryomodule and dump	11/5/18	3/18/19
Design the beam exit window, converter and target, including removal and handling system for 1 kW	11/13/18	1/3/19
Fabricate the beam exit window, converter and target, including removal and handling system for 1 kW	1/4/19	3/14/19
M5 1KW target design and fabrication complete	3/15/19	3/15/19
Install target beamline	11/16/18	5/1/19
M6 LERF Beamline Installation and target line complete for 1 kW	5/2/19	5/2/19
Transfer non-irradiated target to VCU	1/14/19	1/25/19
M7 Initial Isotope Separation Protocols Defined	2/28/19	2/28/19
Resuscitate LERF	10/1/18	5/15/19
Review project to obtain beam authorization for 1 kW	5/1/19	5/30/19
M8 JLab Authorization for Low Power Beam Tests Granted	5/31/19	5/31/19
Low current beam irradiations 1kW (@ 18.5 MeV and 40 MeV)	5/31/19	8/29/19
Isotope separation and measurement at VCU	7/23/19	7/29/19
M9 Gallium and Zinc Targets Irradiated at 1kW power level	8/30/19	8/30/19
M10 Initial Isotope Separation Protocols tested and Chemical and Radiological Purity Determined	9/13/19	9/13/19
M11 NMT Student Submits First Paper to Refereed Journal	12/24/19	12/24/19
Design the beam exit window, converter and target, including removal and handling system for 5 kW	1/4/19	3/28/19

Tasks

Name	Begin date	End date
Fabricate the beam exit window, converter and target, including removal and handling system for 5 kW	3/29/19	7/2/19
Install the 5 kW target, shielding and target handling system	7/3/19	9/25/19
M12 Complete fabrication and installation of 5 kW target, shielding and target handling system	9/26/19	9/26/19
Review project to obtain beam authorization for 5 kW operation	10/28/19	11/1/19
High current beam irradiations 5kW(@ 40 MeV	11/4/19	1/31/20
Isotope separation and measurement at VCU	11/19/19	11/25/19
M13 Gallium and Zinc Targets Irradiated at 5kW power level and isotope production evaluated	1/31/20	1/31/20
Simulation (GEANT4, MCNP, FLUKA and ANSYS) studies of:	1/3/19	10/29/19
Beam exit window optimization for thermal distribution and power handling 5 kW and 50 kW	1/3/19	2/1/19
Converter optimization (thickness, type, configuration) for thermal distribution and power handling	2/4/19	4/1/19
Design of target system designed to handle up to 50 kW of beam power	4/2/19	10/29/19
M14 Complete Initial 50 kW Target Design	8/30/19	8/30/19
Fabricate Initial 50 kW Target	8/30/19	11/22/19
M15 Initial 50 kW Target Fabricated	11/22/19	11/22/19
Experimental verification of the power handling simulations of target system (no beam)	11/29/19	3/30/20
M16 Test 50 kW Target Thermal Management (No Beam); Compare with Simulations	3/31/20	3/31/20
Irradiate 50 kW target with 5 kW beam	2/3/20	5/11/20
Isotope separation and measurement at VCU	2/18/20	2/24/20
M17 Test Improved Isotope Separation Protocols and Determine Chemical and Radiological Purity	5/1/20	5/1/20
M18 50 kW Target Tested with 5 kW Beam at ~10 MeV	5/15/20	5/15/20
M19 Determine optimum parameters for routine isotope production	5/15/20	5/15/20
Write up Results	4/1/20	5/28/20
M20 Deliver Final Report to DOE	5/29/20	5/29/20

Gantt Chart

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