

Ion Source and Low Energy Beam Transport (LEBT)

About 30% of the ESS construction budget will be realised by means of in-kind contributions (IKC) from European Partners. The Ion Source and LEBT are in-kind contributions from ESS' Italian in-kind partner INFN-LNS. Together, these systems will launch the ESS proton beam at the front end of the linear accelerator.

In-Kind Partner: National Institute for Nuclear Physics' National Laboratory of the South (INFN-LNS) in Catania
IKC value: 4.5 MEUR

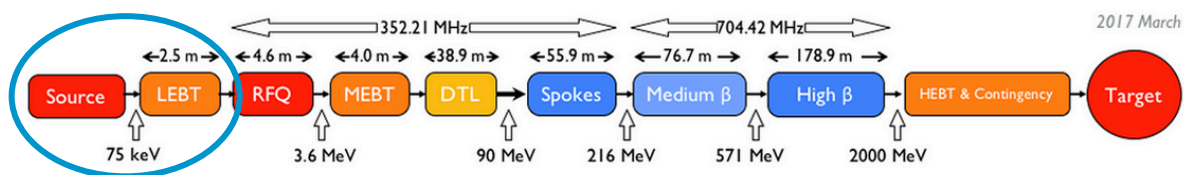


What is the Ion Source? The Ion Source is the origin of the ESS proton beam. Hydrogen from a gas bottle enters the ion source, where microwaves create a plasma separating the hydrogen atoms into protons and electrons. The protons are extracted from the source and guided into the accelerator beamline, which starts with the LEBT.



ESS high-intensity proton source along with LEBT line designed and commissioned at INFN-Catania. (PHOTO: INFN-LNS)

What is the LEBT? The Low Energy Beam Transport takes the proton beam from the ion source to the Radio Frequency Quadrupole (RFQ). It has focusing elements and beam instrumentation that allows monitoring of the beam properties. The RFQ is the first of a series of different types of acceleration structures, all being under vacuum. They quickly bring the protons to nearly the speed of light before they hit the ESS target wheel, generating the neutrons that will be used for scientific research.



The Ion Source and LEBT, the first machine components, were lowered into the ESS Accelerator Tunnel in Lund in December 2017 after a weeklong journey from Italy to Sweden. The installations at ESS began in early 2018 and the official commissioning event took place in November 2018.