

# **ELECTRON BEAM ION SOURCES, TRAPS, AND STRINGS: VERSATILE DEVICES TO MEET THE HIGH CHARGE STATE ION NEEDS OF MODERN FACILITIES**

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## *Abstract*

Electron beam ion sources (EBIS) and its variants such as the electron beam ion trap (EBIT) and electron string ion source (ESIS) have been selected to provide highly charged ions for several atomic and nuclear physics facilities. Since the capture and breeding can be short and highly efficient, EBIST devices are increasingly being chosen for trapping and/or reacceleration of radioactive beams. The sources can range from petite to grand, using electron beams from  $\sim 1\text{mA}$  to 10A or more. They often serve accelerators and beam lines in large laboratories but they can be self contained laboratories where experiments are made in situ. We will discuss the basic principles as well as applications of these sources at various facilities around the world. Some emphasis will be placed on the recently commissioned RHIC EBIS source which is now providing beams for both high energy physics at the relativistic heavy ion collider as well as the NASA space radiation laboratory at BNL.

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