

## **K500 Operations and Development**

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### **Introduction**

During the 2011-2012 reporting period a total of 22 different beams, including 7 newly developed beams, were used for experiments, and there were a total of 29 beam tunings for these experiments. The SEE program is treated separately in this progress report.

### **Ion Source**

During the shutdown ECR1 was opened for examination, and it was found that there had been no further deterioration in the damaged spot that had developed over a plasma flute on the aluminum wall. A beam of scandium was produced using ECR2. The material was sputtered into the source with a particularly high sputtering voltage of 3.5 kV. This was similar to titanium.

### **Cyclotron Beams**

New beams of HD<sup>+</sup> (hydrogen-deuterium molecular ion) at 22 AMeV, <sup>18</sup>O at 10 AMeV, <sup>20</sup>Ne at 40 AMeV, <sup>26</sup>Mg at 16 AMeV, <sup>48</sup>Ca at 4.6 and 5.0 AMeV, and <sup>50</sup>Ti at 5.0 AMeV were developed for experiments.

### **Operations**

For the period April 1, 2011 through March 31, 2012, the operational time is summarized in Table I, while Table II lists how the scheduled time was divided. There was an unusually large amount of unscheduled maintenance, the bulk of which involved water leaks into the K500 vacuum. The greatest time was lost in April and May to a leak in a dee, while somewhat less time was lost during December to a leak in the upper liner because the final repair was accomplished during the annual shutdown.

**Table I.** 2011-2012 Operational Time.

<b>Time</b>	<b>Hrs.</b>	<b>%Time</b>
Beam on target	5639.58	<b>76.8</b>
Tuning, optics, set-up	10.00	<b>0.1</b>
Beam development	634.92	<b>8.7</b>
Scheduled maint.	106.00	<b>1.5</b>
Unscheduled maint.	938.75	<b>12.8</b>
Idle time	10.75	<b>0.1</b>
<b>Total</b>	<b>7440.00</b>	<b>100.0</b>

**Table II.** 2011-2012 Scheduled Beam Time.

<b>Time</b>	<b>Hrs.</b>	<b>%Time</b>
Nuclear physics	1973.25	<b>29.7</b>
Nuclear chemistry	964.50	<b>14.5</b>
Atomic physics	0.00	<b>0.0</b>
Outside collaboration	0.00	<b>0.0</b>
Outside users	3079.58	<b>46.3</b>
Beam development	634.92	<b>9.5</b>
<b>Total</b>	<b>6652.25</b>	<b>100.0</b>