

## K500 operations and development

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### Introduction

During the 2013-2014 reporting period a total of 28 different beams, including 13 newly developed beams, were used for experiments, and there were a total of 34 beam tunings for these experiments. The SEE program and the charge-breeding effort are treated separately in this progress report.

### Ion Sources

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.

### Cyclotron Beams

New beams of  $^{10}\text{B}$  at 24 AMeV,  $^{12}\text{C}$  at 22.9 AMeV,  $^{32}\text{S}$  at 23 AMeV,  $^{36}\text{Ar}$  at 35 AMeV,  $^{48}\text{Ca}$  at 4.7 AMeV,  $^{78}\text{Kr}$  at 3.2 AMeV,  $^{86}\text{Kr}$  at 3.0, 3.1 and 3.2 AMeV,  $^{124}\text{Sn}$  at 15 AMeV,  $^{124}\text{Xe}$  at 15 AMeV and  $^{136}\text{Xe}$  at 15 AMeV were developed for experiments. In addition, a beam of  $^{107}\text{Ag}$  at 24.8 AMeV was developed to be used with the SEE program.

### Operations

For the period April 1, 2013 through March 31, 2014, the operational time is summarized in Table I, while Table II lists how the scheduled time was divided. The bulk of unscheduled maintenance time involved the repair of a dee-stem water leak in May. Scheduled maintenance occurred mainly in the January-February shut-down.

**Table I.** 2013-2014 operational time.

Time	Hrs.	%Time
Beam on target	5953	68.0
Beam development	640	7.3
Scheduled maint.	1366	15.6
Unscheduled maint.	801	9.1
<b>Total</b>	<b>8760</b>	<b>100.0</b>

**Table II.** 2012-2013 Scheduled Beam Time.

<b>Time</b>	<b>Hrs.</b>	<b>%Time</b>
Nuclear physics	717	10.9
Nuclear chemistry	2238	33.9
Outside collaboration	385	5.8
Outside users	2613	39.6
Beam development	640	9.7
<b>Total</b>	<b>6593</b>	<b>100.0</b>