K500 operations and development

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Introduction

During the 2012-2013 reporting period a total of 14 different beams, including 3 newly developed beams, were used for experiments, and there were a total of 16 beam tunings for these experiments. In addition, 3 new beams were developed using charge-bred ions from the charge-breeding ECR ion source ECR3. 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 ^{14}N at 25 AMeV, ^{16}O at 12 AMeV, and ^{45}Sc at 5.1 AMeV were developed for experiments. Following the success of charge-breeding with the ECR3 ion source located in the new ion-guide cave, charge-bred beams of $^{85}Rb^{15+}$, $^{85}Rb^{17+}$ and $^{133}Cs^{24+}$ were injected into the K500 through the recently completed RIB injection line and accelerated to 10 AMeV, 15 AMeV and 10 AMeV, respectively.

Operations

For the period April 1, 2012 through March 31, 2013, the operational time is summarized in Table I, while Table II lists how the scheduled time was divided. There was an even larger amount of unscheduled maintenance than last year, again involving water leaks into the K500 vacuum. The greatest time was lost in June and July while somewhat less time was lost during October and November.

TABLE I. 2012-2013 Operational Time

Time	Hrs.	%Time
Beam on target	5030.50	**67.3**
Tuning, optics, set-up	10.00	**0.1**
Beam development	742.25	**9.9**
Scheduled maint.	65.25	**0.9**
Unscheduled maint.	1628.00	**21.8**
Idle time	0.00	**0.0**
Total	**7476.00**	**100.0**

TABLE II. 2012-2013 Scheduled Beam Time.

Time	Hrs.	%Time
Nuclear physics	1276.75	**21.0**
Nuclear chemistry	916.25	**15.1**
Atomic physics	0.00	**0.0**
Outside collaboration	0.00	**0.0**
Outside users	3135.50	**51.7**
Beam development	742.25	**12.2**
Total	**6070.25**	**100.0**