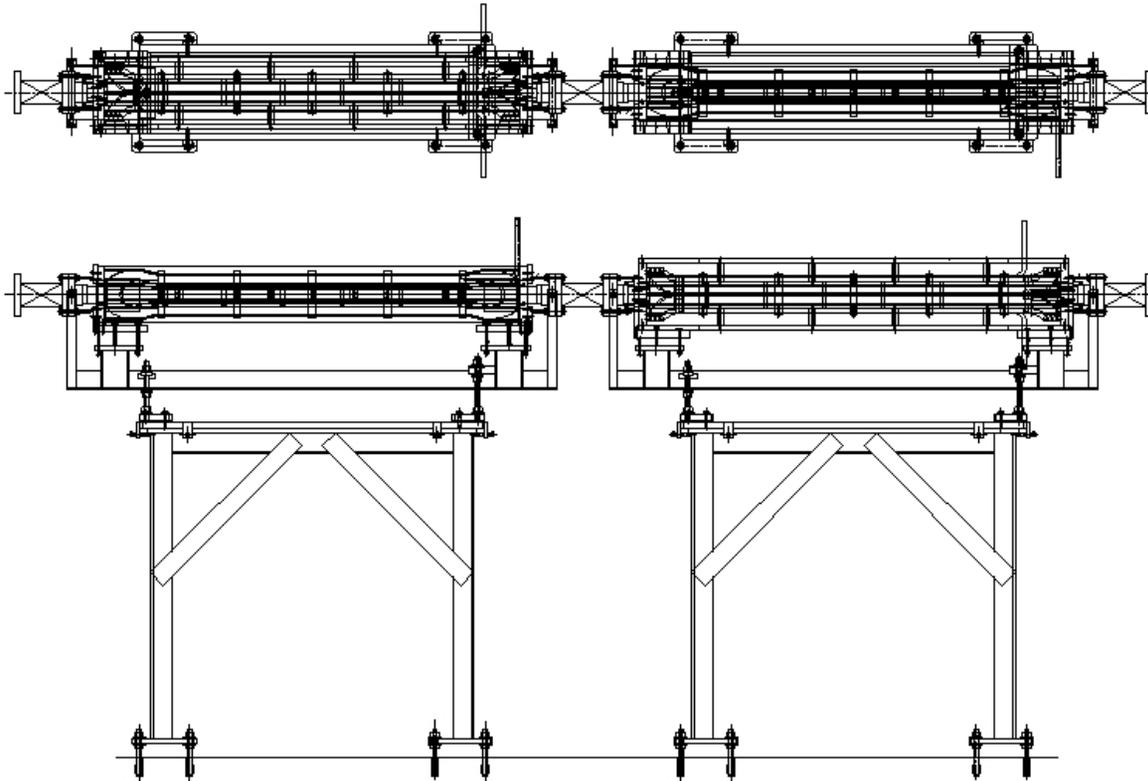
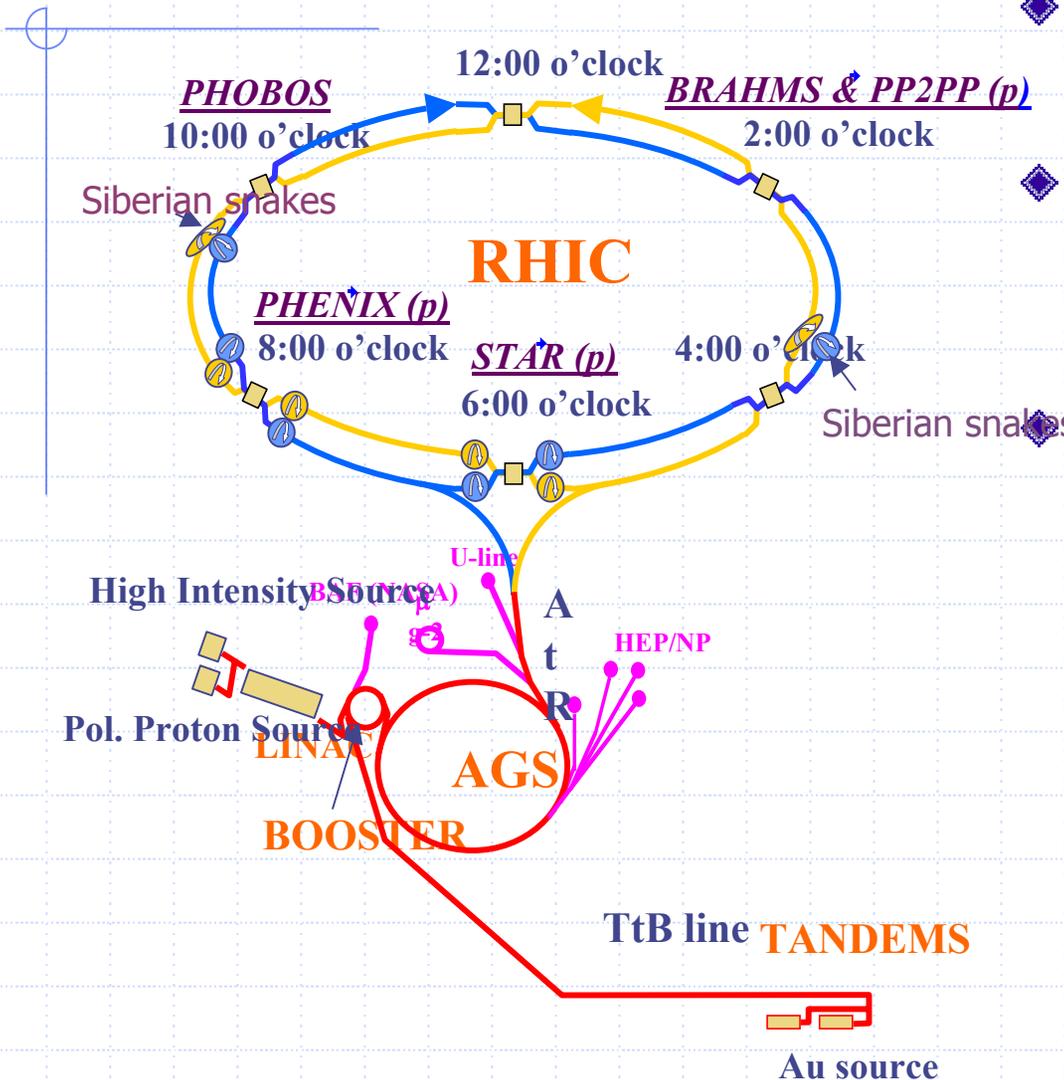


RHIC spin flipper status



RHIC polarized proton setup



- ◆ Two full snakes apart from each other by 180° in phase
- ◆ Stable spin direction in which the spin precesses around is vertical.

◆ Spin precession frequency

$$v_s = \frac{1}{\pi} |\mu_1 - \mu_2|$$

$\mu_{1,2}$ is the angle between the snake axis and the beam direction

and is independent of beam energy. In RHIC, the two snakes' axes are perpendicular to each other and the nominal spin tune is 1/2.

Rhic AC dipole status

- ◆ The spin flipper(vertical ac dipole) was installed and operated during rhic_pp_2002 run.
- ◆ The horizontal ac dipole will be installed mid of Nov.
- ◆ The horizontal ac dipole will use the existing set of capacitors.
- ◆ A new set of power amplifiers are purchased.
- ◆ Two new sets of capacitors are purchased for the spin flipper. A Roth relay is also purchased to allow one to remotely switch the vertical ac dipole between the spin flipper mode(37.5kHz) and betatron coherence excitation mode(64kHz).
- ◆ The horizontal ac dipole, the capacitors and the power amplifiers are currently under bench measurement. They will be installed after the measurement.
- ◆ A new waveform generator will be installed. This will allow us to generate a sinusoidal waveform according to the rf frequency frequency

Plans for the next run

◆ Commissioning phase

- Goal: achieve $>99\%$ spin flip
- Measure the spin flipping efficiency as a function of spin flipper strength
- Measure the spin flipping efficiency as a function of resonance crossing rate
- Measure the spin flipping efficiency as a function of the frequency sweeping range
- prefer to do the measurement at injection if aperture permits
- Measure the efficiency at storage

◆ Operation phase

- An application is preferred to consolidate the spin flipping procedures:
 - ◆ Detune the snake axis
 - ◆ Setup the spin flipper
 - ◆ Run the spin flipper

◆ Measure the spin precession tune to calibrate the snake setting

- The alternative way to measure the spin tune by measuring the beam polarization before and after turning on the ac dipole at a fixed frequency is to measure the asymmetry while sweeping the ac dipole frequency. The zero crossing of the measured asymmetry is where the spin tune locates. However, this requires to upgrade the current RHIC CNI polarimeter to allow one to measure the beam polarization continuously in couple of seconds.