

APEX Priority, Readiness and Planning

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2024 RHIC APEX Workshop

Large Seminar Room, Building 510, BNL

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APEX Proposal Gratings

RHIC should be replaced by RHIC and EIC design and operation
EIC design is more critical than EIC operation



Class:

- 0:** likely to immediately benefit RHIC machine performance, or crucial to RHIC hardware decision-making
- 1:** directly benefiting RHIC machine performance
- 2:** benefiting general accelerator community

Priority:

- A:** a) benefiting RHIC operation; b) well prepared; and c) likely to succeed → **Must do**
- B:** has at least two of the above three → **Recommended**
- C:** has at least one of the above three → **Considered for inclusion**
- D:** none of the above → **Declined**

APEX Proposals for Runs 24 and 25

Previous proposals

Index	Proposal title	Spokesperson	time(h)	Grade	Beam species	Energy	Need ramp d
22-04	Test of tagging He3+ breakup in Hjet	Frank Rathmann	22	1A	He3+	100GeV	Yes
23-02	IP8 optics tuning with crossing angle and short vertex	Xiaofeng Gu	12	1A	Au	100GeV	No
23-03	eCooling of 26.5 GeV Au beam	Vladimir Litvinenko	16	1A	Au	26.5GeV	No
23-04	CeC Plasma Cascade Amplifier Experiment	Vladimir Litvinenko	48	1A	Au	26.5GeV	No
23-05	Radial shift in RHIC using a dipole field offset	GRD	32	1A	Au	100GeV	No
23-08	loss response to cooling	Mike Blaskiewicz	1	1A	Au	100GeV	No
22-05	Studies of electron-ion heating effect	Sergei Seletskiy	12	1B	Au	3.85 GeV	No
22-06	Studies of ions lifetime in the presence of electron beam	Sergei Seletskiy	16	1B	Au	3.85 GeV	No
22-07	Dispersive cooling	Alexei Fedotov	18	1B	Au	3.85 GeV	No
22-12	Ramp to 255 GeV with polarized protons w/ working point near 1/3	GRD, Yun Luo	16	1B	p	255GeV	Yes
23-01	Test of BPM for energy-recovery linac	Igor Pinayev	5	1B	Au	injection	No
23-10	Transition Jump with Reduced Number of Jump Quadrupoles	Henry, Steve Peggs, GRD	8	1B	Au	ramp	Yes
23-11	Resonance Island Transition Jump Part I	Henry, Steve Peggs, GRD	8	2B	Au	ramp	Yes

Total of 214 hours.

Four still need ramp development.

New proposals

Index	Proposal title	Spokesperson	time(h)	Grade	Beam species	Energy	Need ramp d
24-03	Accelerating flat gold ion beams from 31GeV to 100GeV	Yun Luo	48	0A	Au	ramp	Yes
24-07	Injection studies for the EIC	Alexei Fedotov	9	0A	p	injection	No
24-16	Automatic measurement of RHIC stray magnetic field at the RCS locations	Peng Xu	2	0A	N/A	Au 100GeV ramp	No
24-14	RHIC 3D Stable Spin Direction Measurement	V. Schoefer	6	0B	p	store	No
24-09	rhic broad band impedance	Mike Blaskiewicz	8	1A	p	injection&store	No
24-10	Collective Effect Studies in RHIC for the EIC parameters	A. Blednykh	8	1A	p	injection & ramp	Maybe
24-13	Transition crossing with HSR screens	Silvia Verdu-Andres	8	1A	Au	ramp	No
24-15	Measure the recombination rate of the proton beam in the CeC cooling section	Gang Wang	6	1A	p	gamma 28.5	Yes
24-01	Effect of 3-periodicity loss on beam polarization at store	Francois Meot	8	1B	p	255GeV	Yes
24-02	Global coupling measurement and correction based on turn-by-turn orbit	Chuyu Liu, Yun Luo	6	1B	p	injection & store	No
24-04	Verification of RHIC Octupoles Limitations	Silvia Verdu-Andres	4	1B	p	255GeV	Yes
24-05	Measurement of the BPM Electrical Offset with Beam Scan	Igor Pinayev	3	1B	p	injection	No
24-06	Injection studies for the EIC with dual RF system	D. Kayran, S. Seletskiy	7	1B	p	injection	No
24-08	Beam Based Alignment for RHIC rings	M. Sangroula, C. Liu, Joanne	6	1B	p	injection	No
24-11	Study on IBS growth in presence of crab dispersion for flat beam	Derong Xu	12	1B	Au	store	Yes
24-12	Investigate beam-beam impact on hadron beam flatness	Derong Xu	24	1B	Au	store	Yes
Total			379				

Total of 214 hours for alive previous proposals. Total of 165 hours for new proposals.

Total hours of 379 hours.

More than five still need ramp development. The level of efforts of these are different.

Total Beam Time Requested for Runs 24&25

- Total beam time requested: 379 hours
 - with proton beams: 87 hours, 23.0%
 - with He3+ ion beam: 22 hours, 5.8%
 - with gold ion beams: 270 hours, 71.2%
- Proton and He3+ ones must be done in run24 (~109 hours).
- 25 cryo weeks-> 21 weeks physics -> 10 APEX sessions.
- $10 \text{ sessions} \times 15 \text{ hours} \times 0.9 (\text{efficiency}) = 135 \text{ hours}$.
- With FY25 running time similar to FY24, we are short of ~100hours.
- Additional end of RHIC run APEX (~2weeks) is requested by EIC.
- Can the two weeks be separated into two runs to reduce risk?

Planning and Preparation of APEXs

- APEX has got attention of review boards of RHIC operation and EIC design as well as DOE.
- The priorities of experiments are set by the number in the rating.
- Proton related must be done this year.
- To ensure the efficient use of APEX time, readiness is the key to stream out the planned APEX.
- The passive acceptance of APEX one week before didn't work well: experimenters come to us for time when they are ready. FY23 was a bad example in that we had beam time but many experiments not ready especially at the beginning of run.
- We should layout the overall APEX schedule for FY24 before run starts, with some fine tuning several weeks ahead of actual APEX to give enough time for preparation.

How can we improve the APEX schedule and preparation?