



Contribution ID: 2735 Contribution code: TUPM139

Type: **Poster Presentation**

## Simulation and experiment of low-energy slow extraction at XiPAF

*Tuesday, 9 May 2023 16:30 (2 hours)*

Extraction by third order resonance in low-energy stage will suffer from strong space charge effect, high beam emittance, high power ripple and so on. Low-energy slow extraction at 10 MeV has been explored theoretically and experimentally at synchrotron of Xi'an Proton Application Facility (XiPAF), which is a compact synchrotron with injection energy of 7 MeV and extraction energy up to 230 MeV. In this paper, simulation and experiment results of slow extraction of 10 MeV intense beam are presented. By using high-order harmonic excitation, the RF-KO slow extraction scheme below resonance is the best choice for slow extraction in low-energy stage with strong space charge effect. Slow extraction experiment is carried out when the maximum incoherent tune shift of space charge reaches  $-0.06$ , during which, quasi-uniform extracted beam and extraction rate around 65% are achieved.

### Funding Agency

Work supported by National Natural Science Foundation of China (No. 12075131)

### Footnotes

### I have read and accept the Privacy Policy Statement

Yes

**Primary author:** YANG, Ye (Tsinghua University in Beijing)

**Co-authors:** ZHENG, Shu-xin (Tsinghua University in Beijing); WANG, Zejiang (Tsinghua University in Beijing); YAO, Hongjuan (Tsinghua University in Beijing)

**Presenter:** WANG, Zejiang (Tsinghua University in Beijing)

**Session Classification:** Tuesday Poster Session

**Track Classification:** MC4: Hadron Accelerators: MC4.T12: Beam Injection/Extraction and Transport