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## Development of Nanosecond Pulser for The Southern Advanced Photon Source Injection System

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Southern Advanced Photon Source (SAPS) is a 3.5GeV fourth-generation storage ring light source, considered to construction in Guangdong province of china, adjacent to the China Spallation Neutron Source(CSNS). Its natural emittance of the beam is close to the diffraction limit. Since the dynamic aperture of SAPS is far smaller than the physical aperture in the low emittance storage ring, on-axis swap-out injection scheme was adapted. Several couple sets of superfast kickers and nanosecond pulsers are needed. Due to the RF-frequency in the ring is 166.7 MHz, the gap of adjacent bunches is 6ns. In order to realize bunch-by-bunch control, the pulsers' duration needs to be shorter than twice the minimum bunch spacing, which is a big challenge for SAPS. A prototype of fast nanosecond pulser based on semiconductor opening switch (SOS) was developed. A two-stage magnetic pulse compression system was used to pumping the SOS, which can provide with forward and reverse current of several hundreds of amperes. In this condition, the cutoff time of SOS can be reach several nanoseconds, which could meet the requirements of SAPS. The performance of the prototype can produce a pulse at 50Ω, with FWHM (50%-50%) of 5.6ns, bottom width(10%-10%) <12ns, an amplitude of 18kV. In this paper, the design, simulation and test results are presented.

### Funding Agency

### Footnotes

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Yes

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