Abstract
With superconducting crab cavity, 8 superconducting accelerating cavities were stably operated last two years and KEKB luminosity reached the world record of $2.1 \times 10^{34} \text{nb/s}$. For future Super KEK B-Factory (SKEKB) we are developing a high power input coupler for 600kW, a HOM damper for high power absorption more than 30 kW and a cavity operation with reversed phase position for high power loading. The reversed phase experiment at 150 mA of a beam current in KEKB showed potential for the low voltage and high power application.

Summary
Eight superconducting accelerating cavities in KEKB have been operated stably. The cavities provide a total RF power of 10MV and deliver 2.8 MW to the electron beams up to 1.4 A. Recently KEKB achieved the world luminosity record with crab crossing. SC cavities were operated stably during the crab crossing operation and contributed stable operation for the crab crossing.

R&D for SKEKB
1) HOM damper
2) Input coupler
3) Reversed phase mode

Design parameters of the super-KEKB require high beam current, while the RF voltage is much lower than the present KEKB. The loaded Q factor of the SC cavities should be sufficiently reduced. Exchange of input couplers for low Q factor may cause two problems. One is a risk of particle contamination into the cavity, and the other is possible heating at the tip of the input coupler. A new operation scheme, reversed phase mode, was proposed. In this mode, the synchronous beam phase of some SC cavities is reversed so as to obtain lower total RF voltage.

HOM damper
High power test stand for a large beam pipe (LBP) ferrite damper. A cylindrical ferrite of a thickness of 3 mm is sintered on the inside surface of a copper pipe by the hot isostatic press (HIP) method. A cooling water channel is wound on the outer surface of the copper pipe.

Input coupler
New KEKB coupler has single cooling path to increase cooling capacity, and also to reduce fabrication cost. Recently a prototype coupler was fabricated and RF tested up to 750 kW.

Delivered RF powers and trip rates
All of beam trips have been classified by the cause; crab cavity, RF cavities, beam loss, earthquake (EQ), vacuum (VAC), magnets (Mag), others and unknown.

Beam trips caused by Crab, SC and ARES cavities. Trip rate of the SC cavity is 0.5/day at 1.4 A and 0.1/day at 0.85 A.