Measurements of the local strain on REBCO superconducting layer using high energy X-ray and the critical current under compression mode

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Although it has been investigated in detail about the change of critical current under uniaxial tensile strain, the experimental proof under compressive strain is still insufficient. In order to clarify the uniaxial strain dependence of critical current for REBCO tapes, uniaxial tensile deformation mode has been used. In this mode, there was a problem, by which the critical current can be not measured in the compression side.

So in this study, a special holding jig was used to apply continuously the tensile to compressive strain to the tape specimen. In order to clarify the effect on the critical current of ReBCO tapes under reversing strain between tension and compression, the local strain measurement by using high energy white X-ray beam from synchrotron radiation and the critical current measurement were performed. Fig. 1 shows the result of strain measurement using high energy X-ray. In these measurements, a seamless hand-over between tension and compression was made possible by using particular kind of curved beam as called the springboard. As for the obtained the result of critical current in certain specimen, we would like to discuss between the strain of \( I_c \) peak maximum and local strain on REBCO superconducting layer.

![Fig. 1 Relation between applied strain and lattice strain obtained by x-ray strain measurement](image-url)