

8 - 3 Upgrade and Development of the CW Heavy Ion SSC Linac

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The SSC Linac is a CW heavy ion linac designed as the Separated Sector Cyclotron (SSC) injector to improve the HIRFL performance and efficiency. This linac mainly consists of an electron-cyclotron-resonance ion source (ECR), a 4-rod RFQ and IH-DTLs. It has been put into normal operation. Various heavier ion species, such as $^{78}\text{Kr}^{13+}$, $^{129}\text{Xe}^{22+}$, $^{209}\text{Bi}^{32+}$, *etc.* were injected into the SSC at 0.58 MeV/u with two DTL cavities. The average beam intensity extracted from the SSC resulted to be 1~2 order of magnitude higher than before.

In 2022, the upgrade of the SSC Linac was carried out successfully. Other two DTL cavities, namely DTL3&4, were installed on the beam line, as shown in Fig. 1. After this upgrade, the energy of linac will be increased to 1.48 MeV/u. Then the heavy ions like U^{46+} with a final energy of 15.53 MeV/u can be delivered by the SSC.



Fig. 1 (color online) Upgrade of SSC Linac.

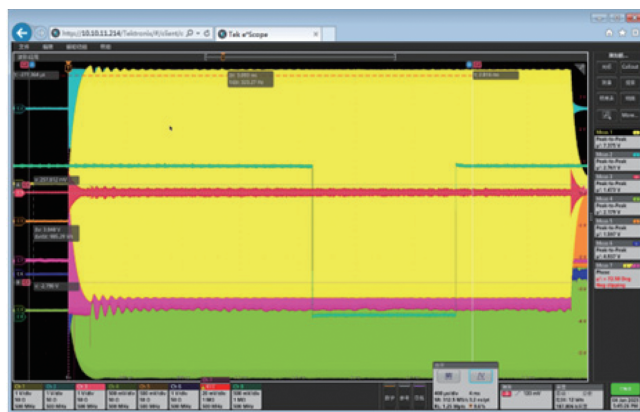


Fig. 2 (color online) RF power conditioning of DTL 3&4.

Two solid-state RF amplifier power using new design method has been finished with internal circulator. The RF conditioning of the new DTLs has been performed at the end of this year. Figure 2 shows the LLRF signal picked up from the cavities. The maximum RF power 54 kW was fed into the DTLs with 10% duty factor in pulse mode. The whole process of RF conditioning took about 100 h. In the near future, the beam commissioning of SSC Linac will be carried out.