From the revolution time spectrum, the masses of $^{101}$In and $^{101\mathrm{m}}$In were obtained for the first time in this experiment, leading to the determination of the excitation energy of the isomer to be larger than 675 MeV. Since the TOF measuring time is 200 μs after injection, the lower limit of the half-life of this isomeric state should be several hundred microseconds. Shell model calculations for this isomeric state in $^{101}$In was in progress, which would yield valuable information about the nuclear shell structure around doubly magic nuclide $^{100}$Sn.

## Reference

[1] M. Wang, G. Audi, F. G. Kondev, et al., Chinese Physics C, 41(2017)030003.

# 2 - 9 Data Acquisition System for Schottky Resonator at CSRe

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To meet the requirement of long-time acquisition without interruptions for the planned nuclear decay experiments at CSRe, a new data acquisition system has been successfully developed in 2016. During the beam time in Dec. 2016, our new system has been running stably without any problems and continuously acquiring hundreds of data without any breaks.

The whole system is based on a spectrum analyzer (R&S FSVR7) and an IQ recorder (R&S IQR100). Both of them are connected to a server via Ethernet. The spectrum analyzer acquires the time-domain information in the frequency range of interest from the Schottky resonator. The IQ recorder collects the information from the analyzer and packs it into data. Once the data have been entirely transferred to the server, it will immediately be removed from IQ recorder. The high-volume solid-state drive (1TB) of IQ recorder allows for a virtually unlimited size of acquired les to be stored in practice. Besides, in order to bypass the unreliable trigger system of IQ recorder, we built an independent trigger system with a microcontroller (Arduino Yun) to translate the TTL signal to network commands.

To implement the aforementioned procedures in an automatic way, we have developed a particular remote control program from scratch. The program is written in Python 3. It has a simple GUI based on terminals with screen-painting and keyboard-handling facility in Linux. The program displays the real-time states of the processing devices and catches the signal emitted from the keyboard to pause or terminate itself.

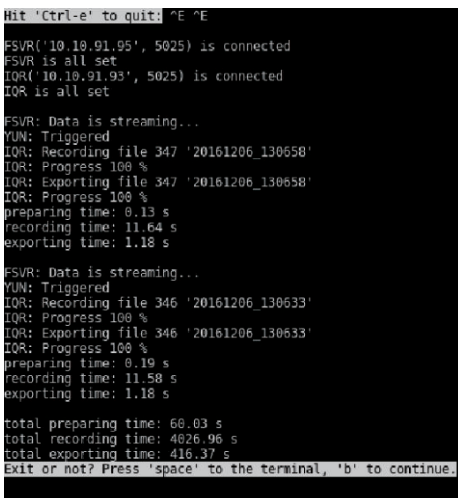


Fig. 1 GUI of the program. The displaying results demonstrate that our system has successfully collected 346 data in our Dec. 2016 experiment.

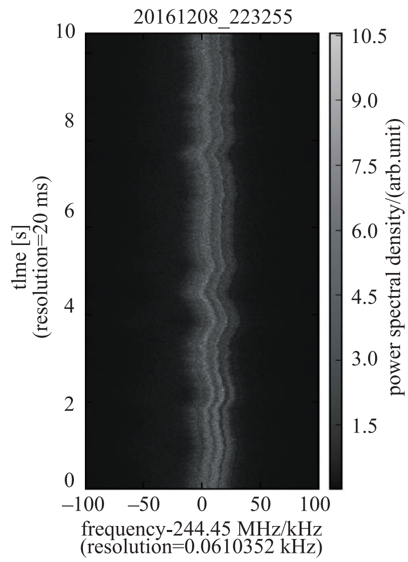


Fig. 2 Typical test result. The waterfall plot arises from a typical data taken in Dec. 2016 experiment. It shows the stripped primary beam $^{40}\mathrm{Ar}^{18+}$.

The tests for our new system have been successfully completed in the mass measurement experiment in Dec. 2016. In one of our test runs, the system acquired tens of huge les whose size amounts to ca. 2 GB each. In another test, it has been continuously running for hours while collecting 346 les in total as demonstrated in Fig. 1. In one of test data les, we could get sharp time-frequency spectrogram of $^{40}\mathrm{Ar}^{18+}$ from that experiment as displayed in Fig.2. In conclusion, our data acquisition system satisfies the demands of successively collecting measurement data. As an important step, it paves the way towards the nuclear decay measurements at CSRe in the near future.