Developments at the Cologne 10 MV tandem AMS beam line for 60Fe AMS measurements.

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Only a few accelerator facilities around the world provided the needed high energies for isobar separation for medium mass nuclides like 53Mn and 60Fe.

Therefore, CologneAMS wanted to enlarge its measurement capabilities by use of the 10 MV FN tandem accelerator. It was exclusively used for nuclear structure experiments which did not demand equally high ion beam transport qualities.

In 2019, the newly built AMS beam line was put in operation. First test measurements 60Fe using the gas-filled magnet were conducted. The revealed high transmission losses and system instabilities were investigated by a range of developments. They have enabled the required long-term stability with high transmission. Additionally, first automatic AMS measurements were successfully performed.

Furthermore, the ion beam development and shape inside and after the gas-filled magnet was investigated to determine the best gas type and pressure. The corresponding Monte-Carlo simulations were improved by including an approach for the gas-density effect.