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New linac designs by High Energy Sources R&D Group at Varex Imaging

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High Energy Sources R&D group at Varex Imaging has developed several Accelerator Beam Centerline (ABC) and Linear Accelerator (linac) designs in the past 8 years. Here we present a summary of our recent progress. M9V linac, featuring our new ABC, is being developed to further improve characteristics of 9 MeV accelerator. The new ABC is shorter than the standard 9 MeV linac, and the focusing solenoid is completely removed. The overall system design increases dose rate and reduces the weight and complexity. In addition, our new version of K15, called K15V or V15, is being redesigned with a hybrid Standing Wave (SW) and Traveling Wave (TW) reverse feed configuration, protected by US patent. We expect it to produce significantly higher dose rate of up to 40000 R/min at 1 m. The first SW section of this linac may be used separately in 9 MeV system we called V9, which is also expected to deliver higher dose rate of up to 20000 R/min while substantially reducing neutron yield compared to 15 MeV machine. We have also tested a new concept implemented on 6 MeV linac, which permitted reducing the electron beam focal spot size to 350±150 μm without utilization of any magnetic systems.

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Author: PROSKIN, Stanislav (Varex Imaging)

Co-authors: AMOROSO, Adam (Varex Imaging); Dr MISHIN, Andrey (Varex Imaging); ANDERTON, Aren (Varex Imaging); MILLER, Lawrence (Varex Imaging); HU, Martin (Varex Imaging); LAFAVE, Rich (Varex Imaging)

Presenter: PROSKIN, Stanislav (Varex Imaging)

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