

M4 Isa Mill Commissioning

An M4 Isa Mill™ has been successfully commissioned at iThemba LABS by a team from the University of Cape Town, Xstrata Technology and Anglo Platinum. The mill was donated by Xstrata Technology as part of a project proposal to conduct Positron Emission Particle Tracking (PEPT) experiments at the recently launched PEPT Cape Town facility.

In 2007, Xstrata Technology (XT) first approached the Comminution group within the Centre for Minerals Research (CMR) about conducting Positron Emission Particle Tracking (PEPT) studies on an IsaMill™. Representatives from the CMR (Indresan Govender, André van der Westhuizen) as well as XT (Josh Rubenstein) visited the Positron Imaging Centre at the University of Birmingham in February of 2008. At the time, this was the only PEPT facility offering research services to the mineral processing industry. During this visit, preliminary work was carried out to confirm the suitability of the PEPT measuring system for tracking grinding beads in the IsaMill™.

The initial proposal was to test both an M4 and M20 IsaMill™ at the Birmingham facilities. Both the new M4 and M20 pilot plant units destined for South Africa were thus modified for this purpose. However, it was later decided that it would be useful to first track bead motion in a simpler and smaller system. This also allowed an opportunity to use PEPT data to validate the numerical models developed by the University of New South Wales (UNSW). Earlier versions of the models were of a dry system and were only based on the Discrete Element Method (DEM). By this time, UNSW had recently introduced the effect of liquid by developing coupled models with combined DEM and Computational Fluid Dynamics (CFD) components.

In the latter part of 2009 it was announced that the CMR and the Department of Physics at the University of Cape Town (UCT) would set up a PEPT facility at iThemba LABS situated between Cape Town and Stellenbosch in South Africa. The PEPT camera, one of the highest resolution ring cameras built to date, was donated by the Imperial College in England. The camera was relocated from Hammersmith hospital in London to the iThemba facilities.

As such, Xstrata Technology's M4 IsaMill™ unit had to be further modified to suit the new ring type camera (modifications had already been made to accommodate Birmingham's parallel plate detectors). The unit, which was also to be used for signature plot testwork conducted by the CMR on a contract basis for XT, arrived at iThemba LABS in July 2010.

During the week of 19-23 July the M4 IsaMill™ was successfully commissioned by a team from Xstrata Technology, Anglo Platinum, and UCT. An initial PEPT test as well as a series of signature plots were successfully conducted during this week. The CMR will soon commence PEPT testwork, signature plot testing of different ore types, and a number of post graduate student projects using this M4 IsaMill™.



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