In the conference paper, the effect of external magnetic field on kilogram realization experiments with a moving magnet is described. As opposed to the traditional Kibble Balances with moving coil, the external magnetic field brings an asymmetry in testing the Ampere’s Law of Force and Faraday’s Law of Induction. We have proposed a method based on external magnetic flux density difference measurements in the direction of gravitational acceleration for investigating the effect of external magnetic field on Kibble Balance experiment developed at National Metrology Institute of Turkey.

In the conference paper we have used the fluxgate gradiometer as it is where the distance between the two sensors is around 90 cm. In ACTA IMEKO paper we have modified the rigid beam so that two sensors could be fixed at different positions. After this modification the minimum distance between the two sensors could be set to 7.5 cm. As the coil thickness is around 3 cm, we checked the linearity behavior of the sensors at three different positions. Based on the observed linear behavior, we interpolated the standard deviation obtained by fluxgate gradiometer at the minimum distance between the sensors of fluxgate gradiometer to the one over the top and bottom surfaces of the coil by linear approximation. The results indicate that we can use this method to take into account the asymmetry between the Ampere’s Force Law and Faraday’s Law of Induction due to the External Magnetic Field in moving magnet Kibble Balance experiments. As the standard deviation is small enough, once the contribution of External Magnetic Field in the realization experiment is determined, the sensors could be used for monitoring purposes.

Below the extensions are described point by point.

* The title of the paper is changed.
* The text is both reorganized and extended.
* New subsections are added.
* Fig 4 is changed where the distance between the sensors is 7.5 cm instead of 90 cm.
* Linearity tests with magnetic gradiometer sensors are explained.
* Fig 5 is introduced and the rest of the figures are renumbered accordingly
* Conclusion is extended to emphasize the future plans on comparative analysis with compensation coils as was proposed by the Chinese Team.
* References are extended.