



Modeling Interferometers for space based observation of Earth's gravity field

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Space based observation of Earth's gravity field has led to new insights into the mechanisms of mass transport within the Earth. To improve the sensitivity of the ranging measurement significantly for a long term mission, substitution of the microwave ranging system by a Laser interferometer has been proposed. On the other hand a short term mission based on improved GRACE technology is highly desired to continue the observations. A possible design for a fast follow-on mission including an additional Laser interferometer as a technology demonstrator has been suggested. One significant issue in the development of any space based interferometric ranging system is the pointing between the satellites and in particular the dynamic pointing error (jitter) which will couple into the range measurement. A software toolkit to simulate the optical effects, compute the coupling coefficients and optimise the optical bench based on tracing of general astigmatic Gaussian beams and higher order Gaussian Hermite modes is being developed. After a brief overview of the proposed mission concept the status of the simulations will be presented.