

### Session 3: Synergies and new applications

This session started off with recent development in the field of time transfer. The GLONASS satellites are the first GNSS satellites, which are equipped with a timer and detector in order to allow for time transfer. The fact that microwave code measurements have a resolution of  $\approx 10^{-14}$ , while phase measurements in comparison go down to  $\approx 10^{-15}$ , make optical time transfer an important option. This technique can resolve  $\approx 10^{-17}$ , a potential gain of about 2 orders of magnitudes. The Russian station Tochka obtained about 50 ps for the time transfer on the ground and 80 ps on GLONASS. This contribution was followed by a review on time transfer with T2L2, which stressed the necessity of independent validations, since time transfer is very sensitive to system biases, which makes this technique a very important tool for achieving high accuracy. A comparison between GPS (microwave) and T2L2 yielded a remaining discrepancy of 100 ps.

The next session block dealt with photometry, quantum communication, laser communication and the tracking of space debris, outlining the versatility of laser equipped telescope mounts. To close the acquisition loop of the space targets with telescopes of limited pointing accuracy, several approaches have been presented. This included the application of a night tracking camera in daylight, as well as tip-tilt correction techniques. However, the latter approach requires a beacon in space to lock on, which is available in communication satellites, but not for SLR.

The final part of the session was more diverse, it dealt with the new LASSOS spin model, which was developed to enhance the possibility to extract better lower limits on fundamental physics tests. It was also shown how important the combination of GNSS and SLR for the orbit determination is, since the microwave 1-way ranges are limited by orbit errors, which are not existing in SLR because of the 2-way approach. This made the SUCCESS campaign a real success. Finally the intra technique combination of SHAO presented consistent SLR SINEX solution, which is an important step towards taking the role of an ILRS analysis center.