

Ladies and gentlemen, dear friends and fans of PALS,

Ten years of PALS, the Prague ASTERIX Laser System, is a moment of time worth to pause for recalling the past, reflecting the presence, and thinking about success promising future steps.

I begin with a kind of anecdote telling how the name ASTERIX originated. Since it is an anecdote, it is not the full truth but close to it. The photolytic iodine laser – I use the adjective *photolytic* to distinguish it from the chemically pumped iodine laser - is almost as old as the Nd:glass laser. The high-power potential of both lasers was recognized in the early sixties. At Garching the iodine laser research was started in the late sixties. Why iodine and not Nd:glass? At that time already many scientists and engineers worked on Nd:glass worldwide, but much less on iodine. So the chance for discoveries and glorious findings was higher with iodine. On the other hand, this constellation was not so favorable for rapid progress also an important aspect in research because of the high speed with which it proceeds. This ambivalent situation as we felt it is reflected in the choice of the name we gave the laser: ASTERIX. It is not an acronym. Instead it refers to the ASTERIX story marvelously illustrated in the famous comics: On the one hand, the cute Gauls ASTERIX and his friends living in a small village, and, on the other hand, the Romans and their powerful Empire. Caesar had just conquered Gaul except for this small village. The simple message was then ASTERIX is iodine and the Romans are Nd:glass. Consequently, the amplifiers, according to sophistication and power, were named MIRACULIX, OBELIX, MAJESTIX et cetera. However later, when the system had become large and adequate names short, only ASTERIX remained.

To an appreciable extent, the iodine laser and hence ASTERIX turned out to be a kind of stroke of luck with respect to available optical technology and addressable physics. The saturation energy density of about 1 J/cm² requires a beam fluence of 2 J/cm² for efficient energy extraction. This value is ideally matched to the damage threshold of coatings and many optical components. This and the fact that due to the gaseous medium small-scale self-focusing is not a big issue make iodine laser systems robust and long-living as demonstrated by PALS. The gaseous medium has the further advantage that relatively high repetition rates of up to 1 shot every 20 minutes are achievable at output energies close to 1 kJ as also demonstrated by PALS. These high energies together with pulse durations of several nanoseconds down to hundred picoseconds qualify the iodine laser as an ideal tool for plasma physics that has been

intensively studied in the last forty years up to now and requires high energy density pulses on target. Prominent examples of this research include pulse propagation, Brillouin and Raman scattering in underdense plasma, shock waves in solids, hohlraum experiments, spectroscopy of a broad variety of plasmas, pumping of x-ray and EUV sources, and ion generation and acceleration. All these issues are fundamental in nature but also comprise a high potential for applications, f. e., with respect to inertial confinement fusion and medicine. A large fraction of these topics has been successfully investigated at PALS.

I feel also obliged to mention that ASTERIX/PALS has benefit from the Nd:glass laser technology. This refers to large-sized optics for windows, beam splitters, turning mirrors, KDP and KD*P crystals for Pockel cells and harmonic conversion, control of parasitic oscillations, beam architecture, in particular image relaying with spatial filtering, and diagnostics. Without this technology provision, ASTERIX/PALS could not have been built to the present size and power level.

I am also pleased to see that the challenge of high-intensity physics which has evolved to a booming research area and is likely to stay like this in the next decade is responded to by setting up a 30-TW Ti:sapphire laser which will be synchronized to PALS. I think that this investment is particularly useful for diagnostics. An up-scaled version of this short-pulse laser will certainly enlarge the experimental options even further. In this context I feel very sad about the SOFIA activity which is going to be shut down. Due to the participation in HiLas and ELI, the resources available for man power, funding, and laboratory do not allow to continue SOFIA.

I come back to the present occasion, the tenth anniversary of PALS. To fully appreciate this event, I recall a few milestones: 1997 disintegration of ASTERIX into its components at MPQ and their subsequent transfer to Prague. In-between the construction of the laser hall. In 1999 reconfiguration of ASTERIX in the new environment and in September 2000 commissioning. Within three years, the transplantation of ASTERIX was completed. This fast progress finally disposed of the skepticism shared by some of the concerned persons in the beginning. From 2000 to now, the Prague team succeeded in developing and keeping PALS an attractive European Laser User Facility. In short, PALS is an amazing success story, and therefore my congratulation to all members of the Prague team, and, in particular to those, whom I know from the very beginning on, Karel Jungwirth, Karel Rohlena, and Jiri Ullschmied.