

## History of the iodine lasers at the Institute of Physics of ASCR

*(extended abstract of the talk)*

### End of seventieth:

a directive came from the USSR that the high power laser research should be distributed over the former soviet satellites, Czechoslovakia was allocated the iodine laser system (link Basov-Kvasil)

### July 1979:

A team (Skála, Chvojka, Kovář, ...) of the department of gas discharges at the Institute of Physics goes to Moscow to prepare an iodine system at the Russian Institute of Physics (FIAN) for a transportation to Prague

### September 1979:

Arrival of the system, assembly started in the laboratories of the Faculty of Nuclear Engineering. The system had a Q-switched oscillator and 3 smaller amplifiers ( $\varnothing$  45 mm) pumped by Xe flash tubes and two power amplifiers pumped by the radiation of an open discharge initiated directly in the laser mixture ( $C_3F_7I + SF_6 +$  buffer gas) by a thin tungsten wire explosion on the axis. The output energy attained at FIAN nominally 300 J. Result: the front end of the laser chain operational, but the Russian power amplifiers have never been launched, because of safety problems with the high voltage and neutralization of the post shot discharge products (phosgene)

### Beginning of eighties:

Negotiations with Basov and his subordinates to be allowed a replacement solution – development of “power” amplifier at 50 J;  $\varnothing$  100 mm, filled with  $C_3F_7I + SF_6 + He$ , pumping by flashtubes, as a more practical device for future target experiments (in Moscow no target experiments with the iodine system have ever been done). O.K. from Moscow for the new concept, moving to a new laboratory space at the Institute of Physics

### -1985

Development of the new system (Láska, Mašek, Krása, Skála) including new type of sealed Xe flashtubes (Hermoch, Turčičová, Moc). By 1985 system ready, nicknamed PERUN, routine performance 40 J, 0.5 ns, beam divergence  $5 \times 10^{-4}$  rad, power density  $10^{14}$  W/cm<sup>2</sup>, purchase of an interaction chamber from Poland (Krása-Fiedorowicz)

### 1985-

Start of the first target experiments with the Russian help. Opening of the links to Garching by organization of a series of iodine laser workshops, to which the Garching colleagues were systematically invited (Brederlow, Baumhacker, Volk, ...), Witkowski at the Prague ECLIM (1987). Arrival of a young generation from the Faculty of Nuclear Engineering (Rus, Juha), discovery of the Russian “post-box” institute (later revealed as VNIIEF Arsamas 16) with the world largest iodine laser Iskra 6 (12 channel, 30 kJ).

## **November 1989**

Fall of communism, the frontier opens. 1990 the first reciprocal visit to Garching to see Asterix. Opening of cooperation with CERN to develop a laser ion source for colliders – a very fruitful cooperation with the Polish IPFLM (Wołowski group, Fiedorowicz). France opens a possibility of doctoral studies for the young people of former Eastern Europe (Rus at Lixam-Laserix, Jaeglé, Jamelot). Access to Arsamas 16, purchase of conversion DKDP crystals and their successful application at PERUN – upgrade to PERUN II (20 J in blue light).

## **1995**

First hints of a personal crisis at Garching after the departure of Witkowski and a possible availability of Asterix. First communication to that purpose between prof. Witte and B. Rus at a Karlsbad meeting, at the last Iodine laser workshop an explicit question to Garching through Baumhacker.

## **1996**

Official question to Garching by the director of Physics Dvořák to the administrative director at MPQ Garching Hänsch, answer positive. Start of a frantic search for a suitable experimental hall within the Academy of sciences. Prof. Witte wards off other demands for the placement of Asterix within Germany and EU.

## **1997**

Signing of the transfer contract between the Institute of Physics and MPQ Garching. Last shot at Garching spring 1997. No suitable space yet available, solution: a new joint laboratory between the Institute of Physics and the neighboring Institute of Plasma Physics (Šunka, Chráska, Jungwirth). Construction of a new experimental hall started in parallel to dismantling the system at MPQ.

## **2000**

Transfer finished, Asterix, renamed PALS, operational shortly before the Prague ECLIM 2000.