PAC for Condensed Matter Physics

9th meeting, 13-14 November 1998	10th meeting, 25-26 April 1999
11th meeting, 12-13 November 1999	12th meeting, 14-15 April 2000
13th meeting, 10-11 November 2000	14th meeting, 27-28 April 2001
15th meeting, 22-23 November 2001	16th meeting, 18-19 April 2002

1998 difficult year

Maintenance program of the IBR-2 reactor was fulfilled

Successful restart in October 1998 of the IBR-2 reactor

Modernization plan for the IBR-2 reactor in 1998 failed

1999 still difficult year

IBR-2 reactor well running according to schedule in 1999

Funding of IBR-2 Modernization in 1999:

138k$ (1.11.99) ↔ 220 k$ needed

600k$ / year during 2000 – 2007

Help is announced from Minatom

2000 basic situation:

50% from Minatom and 50 % from JINR

2001-2002: Minatom fulfills its commitment and JINR?

The shortfall in general funding should be fully recovered.

Recommendation

➡ **Priority for the IBR-2 reactor - basic facility-**

The highest priority to the IBR-2 refurbishment

Worldwide competitive neutron source and
Leading basic facility at JINR

The instrumentation on the new cold source matches the characteristics of a long pulsed neutron source

The ESS (European Spallation Source) will be a long pulse neutron source.
The second target station will have comparable characteristics as the ones of the IBR-2 reactor&cold sourc

The optimized instrumentation on the new cold source will give worldwide leading facilities

The program must be started now!!
Before the start of the refurbishment of the IBR-2 reactor the cold source program and the instrumentation must show its quality

The Broad Band Source showed its excellent performance and will run three cycles/year up to 2007 for HRFD and SANS.

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European Conference Bonn, 16-17 May 2002 ess

>>>>>> Welcome to the ESS webpage
at the Forschungszentrum J lich GmbH <<<<<<

https://www.fz-juelich.de/ess/

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What is ESS ?

The ESS (European Spallation Neutron Source) will be the world«s most powerful **pulsed neutron source**.

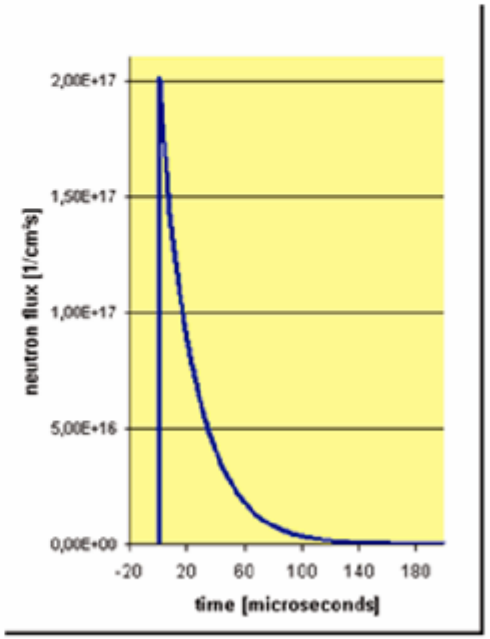
Peak Thermal Neutron Flux:
2×10^{17} /cm^2 s

Neutron Output:
coupled H_2O-moderator average flux 1.2×10^{14} /cm

Neutrons are **produced in a target** by a **nuclear reaction** known as **spallation**, a reaction caused by high energy **protons**. Thereby much more neutrons are released per nucleus than by fission.

The thermal **neutron peak flux** from ESS *2 target stations* will **exceed** the constant flux of existing **high flux reactors by two orders of magnitude**.

ESS will be the 21st century neutron users facility for research in physics, chemistry, biology, materials science and other fields.



Facility parameters:

1.334 GeV protons
5 MW average beam power
1 microsecond proton pulses
50 Hz repetition rate
liquid metal targets

http://www.fz-juelich.de/ess/ess/technical_data.htm

But (1999)

-- extremely poor situation with the maintenance and development of the IBR-2 reactor
-- finite life-time of the essential components of the reactor

Intermediate solution:
revised planning for the reactor modernization:
-- **reduction** of power (2MW to 1.5MW average thermal power)
-- **reduction** of number of reactor cycles (10 to 8 cycles / year)
→ **lifetime extended** up to end of 2002

Danger !! Loss of attractive power and users

Decision should be revised as soon as possible
Refurbishment planning has to be updated continuously with the financial possibilities of JINR

Intermediate solution does not mean inactivity!

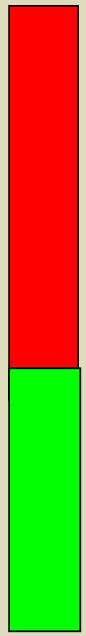
-- The current exploitation of the IBR-2 reactor must assured and guarantied.

-- 1 out of 120 items for exploitation was accepted.

centralization –

Reactor Staff:

- A special reward fund is being studied
- Special support should continue to ensure a save
- reactor performance
- Recruitment of additional staff for the IBR-2
- operation and refurbishment



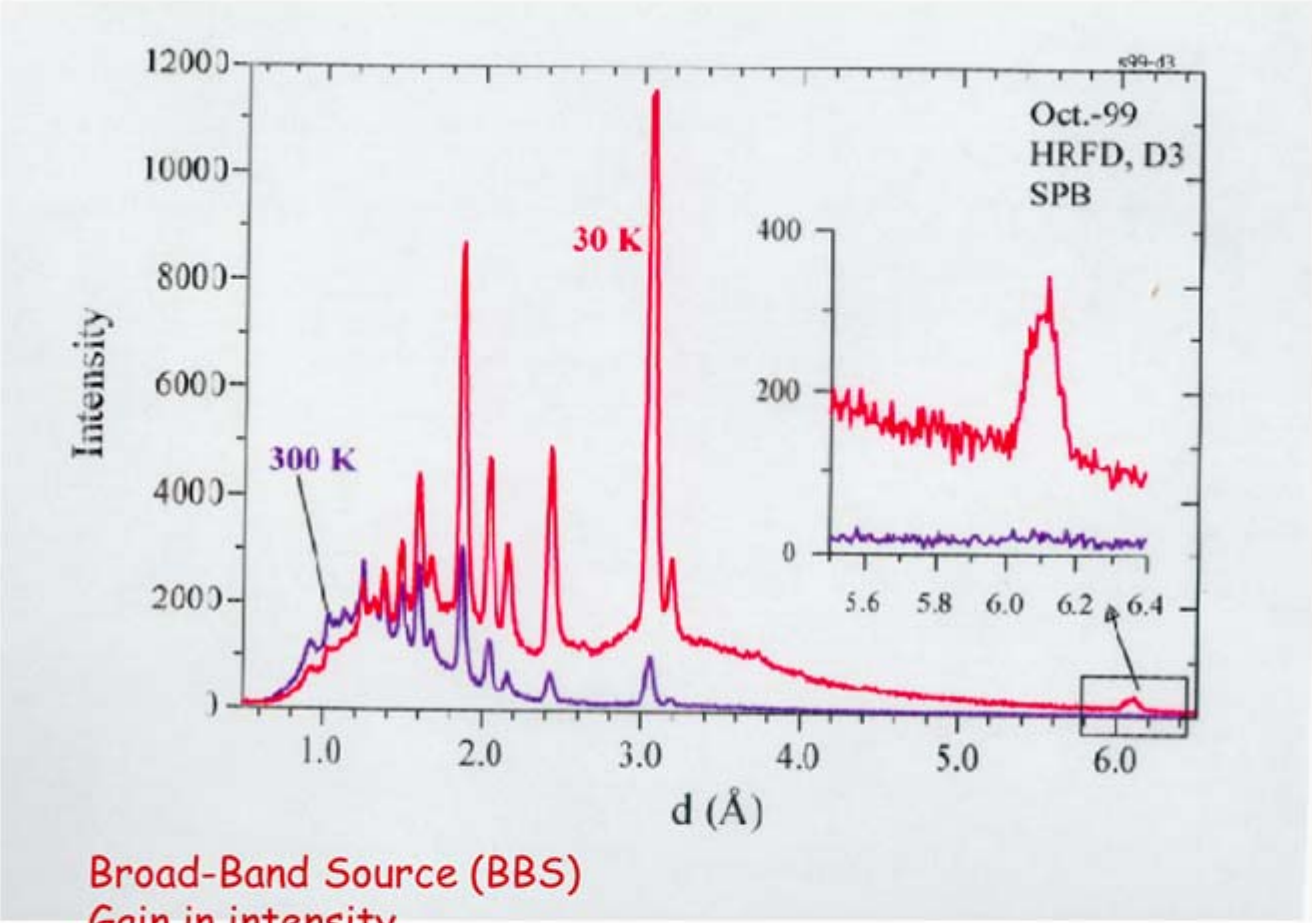
The exchange of the movable reflector –
to happen during 2003 - is extremely carefully planned: (V.Ananiev).

Reactor Refurbishment:

- **Permanent surveillance of refurbishment program collaboration with Minatom Institutions**

With the new cold source channels to New Science can be opened in

- Quasielastic scattering
- Low energy transfer inelastic scattering
- High resolution inelastic scattering
- SANS (Small Angle Neutron Scattering)
- Reflectometry



Broad-Band Source (BBS)
Gain in intensity
Gain in Q-range (can be still expanded)

Spring 2000

The cryogenic moderator was installed and was running successfully during 3 reactor cycles in autumn 1999.

The PAC recommends that the FLNP and JINR Directorates take already now measures to **renew the cryogenic system**

Summer 2000

The PAC recommends that the FLNP and JINR Directorates take measures to **renew the cryogenic system** for cooling

2001-2002

The SC is asked again to support strongly the demand for a **cryogenic system.**

The new BBS (broad band source) to be installed during the reactor stop period 2007-2010) will be discussed together with the instrument development program on the BBS in fall 2002 (PAC-meeting).

Summary

Reactor well operating and Refurbishment Program on a good way

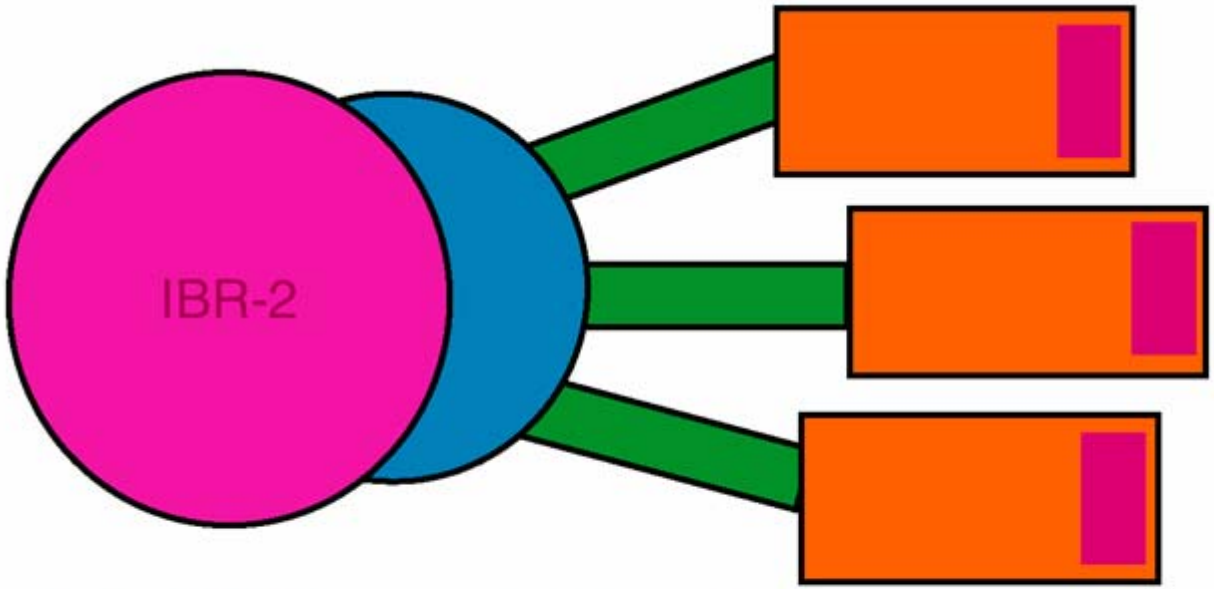
Cold Source is excellent - Cooling System

NEW Broad Band Source (BBS)

Diffractometer and Small Angle Spectrometer For 3 cycles/year on the actual BBS

Instrumentation Development Program focussing on the instrumentation on the cold source is going to be updated (fall 2002)

Worldwide leading capabilities in neutron scattering are obtainable



pulsed and high flux
IBR-2 reactor

optical elements
(neutron guides)

spectrometer
ongoing program

broad band source (BBS)
status: 3 cycles /year (up to 2007)
for 2 spectrometer
plan: BBS for most of the spectrometers
to be built for 2009

detector
starting development

JINR scientific programme in the field of condensed matter physics for the years 2003-2009

Frank Laboratory of Neutron Physics
A.Belushkin

Division of Radiation and Radiobiologie Research
E.Krasavin

Bogoliubov Laboratory of Theoretical Physics
N.Plakida

Flerov Laboratory of Nuclear Reactions
S.Dmitriev