6. COMPUTER CENTER

Network and computer infrastructure. The 1992-1993 experience in using the network resources which were implemented on the basis of SPARC workstations of the SUN firm and personal computers (PC), allowed us to start in 1994 the next stage of evolution of the network and computer infrastructure of FLNP (Fig.12). The network was reconfigured by involving new workstations (two SPARCStation 10 clone and one SPARCStation 2 clone) and additional hard disk devices with a total capacity of 16 Gb. The reconfiguration will be finalized at the end of 1995. In result, user access to the hard disks of the file servers and workstations will be optimized, and the stability of the network, file servers and workstation operation in the case of disk quota overflow will be improved. By the end of 1994, FLNP had 180 registered users of the Laboratory's network.

The distributed file system on several SPARCStations allows access to their data to users from any computer connected to the network. The new workstation console software presents the same desktop environment to users whether they enter the SUN-cluster from X-terminal, an X-terminal emulator on a PC or from the console of a workstation. Upon installation of the Mosaic user interface, the new information service World Wide Web (WWW) became accessible to users - it allows users to enter WWW-servers around the world and use the WWW data bases.

On the file servers of the network, a "pub" directory is installed with commonly used software for PCs, as well as descriptions and documentation of packages which may be used for novices on the workstations. The CERN library package was also installed. Although some SUN workstations are intended to perform special functions (e-mail service, entry to other networks, etc.) all workstations are accessible to users in the normal mode of operations.

Future development of the network assumes a replacement of some communications equipment, purchasing and installation of additional network bridges, laser printers, enlarging the disk capacity purchasing an archive system on the basis of JukeBox for long term data storing, etc.

Electronic equipment development. First and foremost, design and development of electronic equipment was aimed at utilization of the VME standard. A concept was elaborated for the development of electronic systems from the point of view of equipment unification and transition to the new VME technology. The main motive for introducing VME standard in place of the CAMAC standard was the necessity of supporting parallel processes of data acquisition, processing and viewing. In 1994, the first system in VME standard for data storing, monitoring and control was built for the NSVR texture spectrometer.

For investigations in nuclear physics, the new version of a mobile measuring module (MMM) was constructed. The new measuring module was made as a one-crate module that enabled its use in out-of-FLNP experiments. At the present time the MMM is used to perform experiments in the neutron beam of the proton accelerator at the meson factory of INP RAS (Troitsk). On the basis of the MMM, a stationary version of the measuring module was built for the spectrometer for (n,α) and (n,p) reactions at the IBR-30 reactor.

Work has been performed on the development of a computer and measurement module for the ROMASHKA multi-detector spectrometer operating in an IBR-30 reactor beam. The module permits performing three dimensional analysis by simultaneously measuring the time, amplitude, detector number or coincidence multiple. The measured spectra are accumulated in a

256 K 16-bit memory device. For information compression, two digital selection blocks are used. In addition to the main channel for accumulating three-dimensional information, there are two autonomous one-dimensional channels each consisting of a time coder and a 4K 16-bit memory, and one channel consisting of a time coder and a detector number coder for 8 detectors.

A large volume of work on the modernization of equipment and software for the other spectrometers at the IBR-2 and IBR-30 reactors has been done.

Software for data acquisition and control systems. The control software for the High Resolution Fourier Diffractometer (HRFD) consists of two programs - FDC and NDC. The FDC program allows users to check and setup parameters of the data acquisition electronics in BITBUS standard and Fourier chopper electronics, as well as to control them during experiments. FDC performs the experiments as a set of sweeps. The setup operation allows users to change the time of sweep, delay, speed of chopper rotation and type of frequency window. FDC allows users to start the measurement at a given time and to suspend measurement for a given time between two sweeps. This pause may be used to change the position of mechanical devices which are controlled by the NDC program on another computer. The NDC program is intended to control the mechanical devices, refrigerator and low resolution data acquisition systems, which are implemented in CAMAC standard. For synchronizing the work of both programs, the absolute time of the computer clocks is used. FD and NDVI routines are used for viewing high and low resolution spectra and for calculating parameters of marked interactive mode peaks (position, height and width at half height).

The new control software for the SNIM-2 spectrometer has been developed. It allows users to study the magnetic structures of single crystals as well as phase transitions which are induced by a pulsed magnetic field. The software controls the two data acquisition sets of electronics, mechanical devices, heater and magnetic field facility. The electronics of this system were implemented in CAMAC standard.

The software which was developed for the SPN-1, SPN-2 and REFLEX spectrometers allows the instruments to be controlled in the interactive and automatic modes and has some particular features. The control software reads out the large variety of experimental data during the experiments and stores it in a data base, which was specially designed for this system. In off-line mode the software allows users to browse the parameter list of the measurements, view the spectra and perform preliminary data analysis. One of the programs allows users to automatically search for the center of the neutron beam, measure the profile of the beam and move the detectors into a given position relative to the center of neutron beam.

The new generation of data acquisition and spectrometer control systems is being developed at FLNP on the basis of VME standard electronics, modern personal computers and workstations. The main principles for hardware and software organization of the distributed experiment automation system at the IBR-2 reactor have been defined. This organization will give us a maximum throughput for the data acquisition systems, allows us to implement complicated methods for experiment performance which need the simultaneous control of different devices and viewing parameters of the instruments, as well as of accumulated spectra, and allows users to remotely control an experiment via the ETHERNET network.

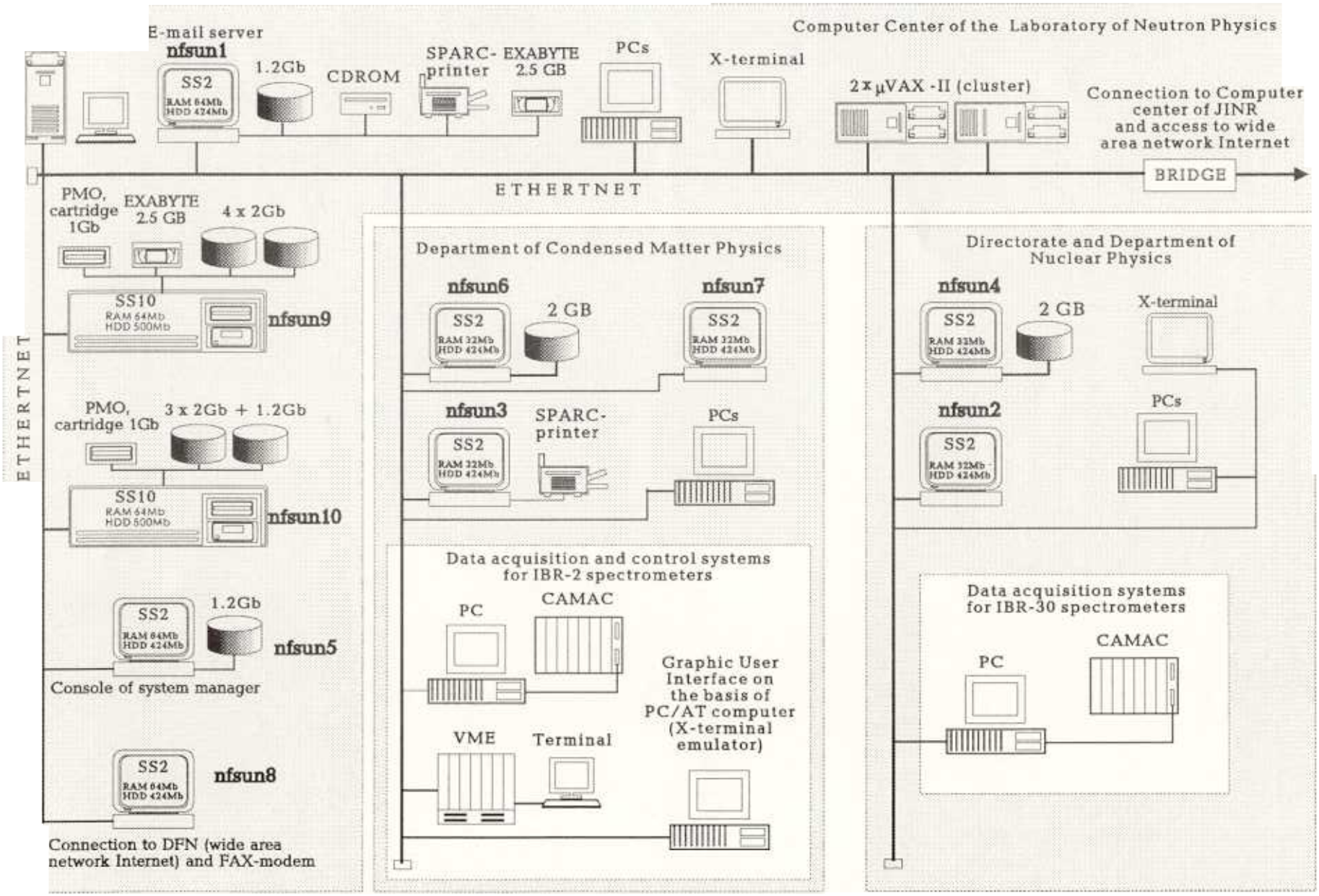

Fig.12. Configuration of the Frank Laboratory of Neutron Physics network resources.