formance estimates will be summarized in this presentation. The changes required in the electron beam transport ["Driver Accelerator Design for the 10 kW Upgrade of the Jefferson Lab IRFEL" D. Douglas, S. V. Benson, G. A. Krafft, R. Li, L. Merminga, and B. C. Yunn, presented at the Linac 2000 conference, Monterey, CA, August, 2000] will be summarized and the optical cavity design will be briefly reviewed.

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### TOPA011 Prospects for a 4th Generation Light Source for the UK

*James Clarke, Hywel Owen, Michael Poole, Susan Smith, Naomi Wyles (Daresbury Laboratory)*

A 4th generation light source (4GLS) forms a major part of the new CASIM (Centre for Accelerator Science, Imaging and Medicine) project that has been proposed to be based at Daresbury Laboratory. Such a light source is envisaged to contain 3 Free Electron Lasers (FELs) that are integrated with a highly optimised low energy storage ring. The storage ring will be optimised to cover the photon energy range of 5 to 100 eV as well as being designed to host a storage ring FEL that would operate in the UV region. A second, linac based, infra-red FEL would be placed in the same building thus enabling pump-probe experiments to be carried out with state of the art photon flux and brightness. The third FEL would not initially be a user facility but would be a linac based SASE FEL research project with the aim of producing ultra high brightness light in the VUV/SXR region. This paper describes the present concept for the 4GLS project and details the current status of the storage ring and FEL designs.

### TOPA012 Design and Manufacture of a Prototype Undulator for the LCLS Project

*Patric Den Hartog, Roger Dejus, Efim Gluskin, Elizabeth Moog, Isaac Vasserman (Argonne National Laboratory), Vladimir Tcheskidov, Nickolai Vinokurov (Budker Institute of Nuclear Physics)*

The goal of the Linac Coherent Light Source (LCLS) project is to build a free-electron laser that will produce x-rays of 1.5 Å wavelength by sending a 14.35 GeV electron beam from the Stanford Linear Accelerator through a line of undulators. The undulator line will consist of a series of 3.4-m-long undulator sections, with diagnostics inserted between the sections. The design for an undulator section has been completed, and a prototype is under construction at the Advanced Photon Source. The undulator will be a fixed-gap device, with a magnetic pole gap of 6 mm and a period of 30 mm. The strongback is machined with high accuracy from a solid Ti bar. Titanium was chosen for its low thermal expansion and for its strength and low density, which will reduce the weight and the deflection of the strongback under gravity. The fixed gap will also aid in making the device stable. The magnetic requirements for the device are demanding, so provisions have been made for accurate magnetic tuning. Details will be presented.

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## Session TOPB: Controls and Computing (1 of 2)
## Grand Ballroom (Session B) at 13:30
## Session Chairs: David Gurd (LANL) and Frank Zimmerman (CERN)

### TOPB001 How to Commission, Operate and Maintain a Large Future Accelerator Complex from Far Remote Sites (Invited)

*Ferdinand Willeke (Deutsches Elektron Synchrotron)*

A study of international collaborations on future large accelerators [Paul Czarapata FNAL, Don Hartill, Cornell; Steve Myers, CERN; Stephen Peggs, BNL; Nan Phinney, SLAC; Mario Serio, INFN; Nobu Toge, KEK; Ferdinand Willeke, DESY; Chuan Zhang, IHEP Beijing: Report of the Inter-Laboratory Task Force on Remote Operation, to be published] considers a facility, remote from most of the collaborating institutions which is designed, built and operated by a collaboration of equal partner institutions around the world. Expert staff from each laboratory remain based at their home institution but continue to participate in the operation of the machine after construction. The full range of operation of an accelerator is considered including commissioning, machine development, maintenance, trouble shooting and repair. Experience from existing laboratories confirms that most of the activities are already performed "remotely". Experts are required to be physically present only during initial commissioning and for particularly difficult problems. Repairs require a local technically trained maintenance crew. Most of the interventions are made without an expert and most of the rest are resolved with only a phone call. There appears to be no technical obstacle to operate an accelerator remotely, even from a different continent. General and technical implications of this model are analysed. The major challenge lies in solving the complex management, sociological and communication problems. Much can be learned from the large high energy physics experiments and astronomy projects which involve international collaborations of distant institutions.

### TOPB002 Parallel Computations of Wakefield Effects in Linear Colliders and Storage Rings (Invited)

*Zenghai Li, N. Folwell, G. Golub, A. Guetz, K. Ko, B. McCandless, C. Ng, Y. Sun, M. Wolf, R. Yu (Stanford Linear Accelerator Center)*

Wakefields have become increasingly important in existing and next generation accelerators as the operating regimes are continually moving towards higher currents and smaller bunches. Wakefield effects have primarily been calculated using standard programs like MAFIA that run on single CPU computers, although it is evident that multi-processor machines will be needed to model larger structures of complex shapes. They include, for example, the accelerating structure for the NLC (RDDS) and the entire beamline complex around the interacting region of the PEP-II. In this talk we will describe how wakefield effects are computed in these large structures using the parallel codes, Omega3P and Tau3P, and will address the computational challenges associated with such large-scale simulations.

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