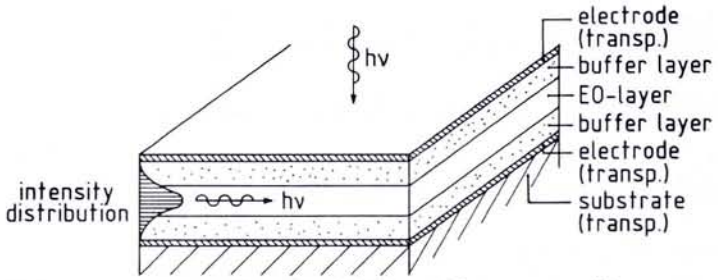

Fig. 2 — Schematic representation of a slab-like multilayer waveguide structure.

The electrodes can be applied by evaporation or sputtering and the polymer layers (buffer, core) by spin coating, dipping, *etc.* The electrode thickness is several tens of nanometers, while that of the polymer layers is of the order of microns. Monomode channel waveguides can be defined in the multilayer using reactive ion etching.

Nonlinear Devices

In order to apply and evaluate our optically nonlinear polymers, cooperative research efforts have been started with partners active in integrated optics and related technologies. Within the European Community supported programme "Research on Advanced Communication in Europe" (RACE Project R1019, "Polymeric Optical Switches"), researchers based at the Dr. Neher Laboratories of the Dutch PTT, Leidschendam, and at Barr and Stroud, Glasgow, have produced a monomode channel waveguide phase modulator based on an Akzo polymer. The electro-optic effect was induced by poling at about 130°C with a field strength of 156 V/μm. The electro-optic coefficient, r_{33}, which is related to $\chi^{(2)}$ *via* $\chi^{(2)}{}_{222} = r_{33}n^4/2$ was found to be equal to 28 pm/V for 1.3 μm propagating radiation; this r_{33}-values is among the highest reported [2, 3]. The r_{33}-value for lithium niobate is equal to 32 pm/V so a polymer with about the same nonlinear effect as for inorganic materials has been realised.

The Laboratoires de Marcoussis, another partner in the RACE project, have built a polymeric integrated Mach-Zehnder interferometer that exhibits an intensity modulation depth of about 15 dB. This type of device can, if monolithically integrated with emitters and receivers, be used to tune and modulate laser output before it is injected into a telephone network, and to assist in detecting the correct signals at the receiving end.

At IMEC in Ghent (also a partner), polymeric tunable Fabry-Perot (free space) modulators have been constructed for materials evaluation. Such devices may form the basis of large area spatial light modulators for parallel optical image processing. In addition, under a separate bilateral Akzo/IMEC cooperation, the monolithic integration of an infrared diode laser with a polymeric multilayer waveguide has been demonstrated.

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Semiconductor Surface Science and Engineering

EPS-ACAPPI Workshop (EIW-7), Leningrad, USSR

The EPS Action Committee for Applied Physics and Physics in Industry is organizing a Europhysics Industrial Workshop titled "Semiconductor Surface Science and Engineering" that will take place in Leningrad on 19-22 June 1990.

The workshop is an "historic" first for the Society since representatives from eastern and western industries, institutes and universities will meet informally with Russian colleagues pre-eminent in the field to explore ways in which academically orientated research can assist industrial development.

As is usually the case for industrial workshops, the programme is not too densely packed to allow time for discussion. There will be seven sessions with a total of about 30 presentations, 12 of which will be made by experts from Russia and the remainder by a well-balanced mixture of scientists from eastern and western Europe.

The organisers have been able to obtain funds to provide hotel accommodation for participants from outside Russia.

Hubble Aloft

The Hubble Space Telescope is a joint NASA/ESA project with a 15% participation from ESA. The first cycle of the so-called "General Observer Proposals" netted requests for 11 000 hours of observing time using the telescope's five instruments. With only 1200 hours available and an average allocated time of 10 hours, an international panel selected just 162 proposals, 20% of which came from ESA Member States. The problem for astronomers is that the 20% allocation for Europe does not reflect the fact that its community is larger than the US's.

The Space Telescope Science Institute in Baltimore, USA will manage allocation and scheduling. The latter is a nightmare owing to numerous operational constraints including reflected sunlight, the earth's shadow, radiation from Van Allen belts, *etc.* Europe's centre for coordinating observations will be at the headquarters of the ESO in Garching, FRG.

While astronomers can spend up to a few weeks at the Institute in Baltimore, they can also send in proposals. Providing these are accepted, they will be sent a magnetic tape when the observations are completed. They will have one year to write up their work before the data falls into the public domain.

Now that the HST is finally aloft, just 44 years after the first serious study of the benefits of a special observatory in space, nearly seven years after its first expected launch date, we are awaiting reports of the first images as we go to press.

The telescope is scheduled to remain on station for 15 years with in-orbit repairs and replacement, circulating the earth every 95 minutes during which time it is can see a particular area for 45 minutes. Weighing 11 tonnes, it is the largest satellite ever to be lifted into space by the shuttle launcher. It will allow us to look back some seven times further in distance using cameras and detectors whose resolving power is a factor 10 better than for to-day's ground-based telescopes.

Europe was responsible for one of the cameras — the Faint Object Camera — that counts individual photons in the UV, undisturbed by the earth's atmosphere, using exposures that will sometimes last up to 10 hours. Experts anticipate that some of the most exciting discoveries will not have been predicted so everyone is keeping their fingers crossed for a successful commissioning phase, lasting seven months, before Hubble starts to observe in earnest at the rate of about 20 images daily.

Meanwhile, Back on Earth...

The overall excess demand for Hubble (almost a factor 10) is perhaps not so surprising because the best ground-based telescopes must routinely cater for factors approaching four. The latter clearly remain sought after, especially in view of technical advances such as active optics, that permits compensation for atmospheric disturbances, and arrays of telescopes. The decision on where to site one such European array comprising four separate telescopes with mirrors eight metres in diameter will be announced shortly.