inconsistent with the observed separations.

As indicated at the begin of this section, analysis of modes trapped in the convection zone provides a test of the equation of state, together with the potential for determining the helium abundance in the outer parts of the Sun (see, for instance, Vorontsov, Baturin & Pamyatnykh, 1991; Christensen-Dalsgaard & Däppen, 1992; Kosovichev *et al.*, 1992). The dominant effect comes from the second ionization zone of helium which is sensitive to the equation of state and the helium abundance, yet sufficiently deep to be largely unaffected by the near-surface uncertainties. By analyzing $\mathcal{H}_2$ Pérez Hernández & Christensen-Dalsgaard (1994) showed that the so-called MHD equation of state provided a substantially better fit in the second helium ionization zone to the observed frequencies than did a somewhat simpler description based on the Eggleton *et al.* (1973) formulation but including Coulomb effects in the Debye-Hückel approximation. On the other hand, Dziembowski, Pamyatnykh & Sienkiewicz (1992) inferred that there are significant departures from the MHD treatment in somewhat deeper regions in the convection zone. These results are striking illustrations of the power of helioseismology to investigate details of the thermodynamic properties of the solar plasma.

4. Seismic solar model (P. Goode)

The method of frequency inversion reveals that within the quoted observational errors, it is possible to achieve a precision of $\sim 10^{-3}$ in the sound speed determination through most of the Sun's interior. Only for $r < 0.05R_\odot$ is the precision $\sim 10^{-2}$. The accuracy of the density and pressure determinations is only slightly worse. Such restrictions impose significant constraints on the microscopic physical data, i.e. opacities, nuclear reaction cross-sections, and diffusion coefficients as well as on the solar age. The helioseismic age is consistent with that from meteorites.

Recently released low-l solar oscillation data from the BISON network combined with BBSO data yield the most up-to-date *solar seismic model* of the Sun's interior. For the core, the *solar seismic model* from the new data are consistent with the best, current standard solar models. An astrophysical solution to the *solar neutrino problem* fades away.

In constructing this model from seismic data, we make two assumptions: 1) we assume that the only forces acting in the Sun's interior are gravity and pressure, P and 2) we know the adiabatic exponent, Γ_1, as a function of P and the density, ρ, and the chemical composition; and further, that Γ_1 departs significantly from the model value only in the homogeneous outer layers covering the convective envelope and atmosphere. We note that the first assumption implies spherical symmetry and parenthetically that this assumption can be seismically tested. The ingredients of this model are the measured values of mass, radius and photospheric abundance of heavy elements.

Our seismic model does not yield the temperature or the hydrogen abundance in the core; and, therefore, it does not enable us to evaluate the neutrino flux. To do this, one has to assume thermal equilibrium and make use of opacity and nuclear reaction rate data. Still, the closer agreement between the speed of sound in the most up-to-date seismic model and the best reference model is a powerful argument in favor of the standard modeling of the solar interior. Therefore, these latest results provide greater support for a non-astrophysical solution of the solar neutrino problem. We emphasize that except for the $^7B + p$ reaction rate, all other known modifications in solar models affecting prediction of the neutrino flux leave signatures in the speed of sound that can be detected with existing data.

We are clearly on the road to achieving good resolution in probing the solar core. We feel that it is more important to extend the number of low-l modes rather than obtaining more accurate frequencies of the modes we have. The broader frequency range is critical to obtaining greater spatial resolution in the core. Our experience shows that adding even a single $l = 0$ mode at higher frequency leaves a visible trace in the speed of sound in the inner core.

5. Internal dynamics and magnetism of the Sun (L. Paternò)

The present internal dynamics and magnetism of the Sun have been determined by the initial conditions in the pre-main sequence age, by the angular momentum loss and its redistribution in the interior, and the interaction of motion with magnetic field.

The history of the Sun rotation is traced back by observing the present rotation of stars with the same mass as the Sun at earlier evolutionary stages. The present angular momentum of the Sun, as deduced from its internal rotational behavior derived from helioseismological data, appears to be a small percentage of the original one contained in similar mass stars (T Tauri and α Persei). It is not easy to reconcile the sharp decrease in the surface angular velocity, which follows the α Persei phase, with the subsequent soft decrease, taking place after Pleiades phase, unless some very effective mechanism transfers angular momentum from inner to outer regions, where is lost in the solar wind. Such a mechanism is probably magnetic in origin, since purely hydrodynamic instabilities fail to transfer angular momentum at a rate sufficient to determine the presently observed flat radial gradient of the internal angular velocity.

In the pre-helioseismological era, any inference about the internal dy-