

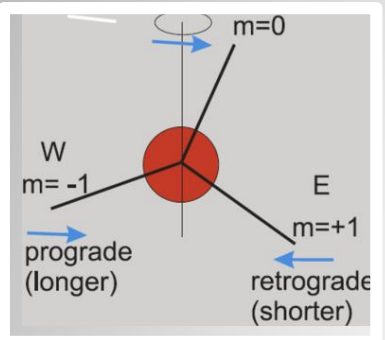
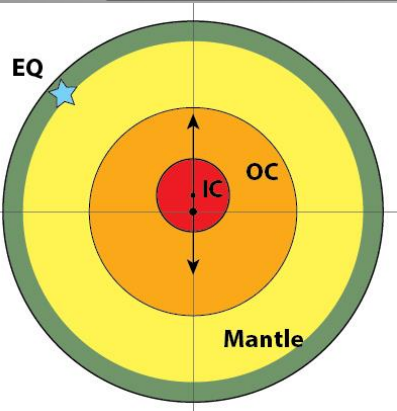


Detection and estimation of the Slichter mode based on strain observation of the 2010 Chilean earthquake

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Our work is the **first attempt** to detect the Slichter mode, based on the **laser interferometer-strainmeter** with a new asymptotically optimal algorithm for data analysis, which allows to detect the Schlichter mode at the **signal-to-noise ratio 10^{-2} - 10^{-4}** .

Slichter mode – triplet ${}_1S_1$

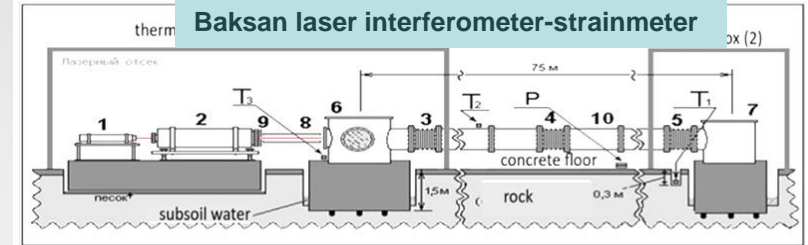
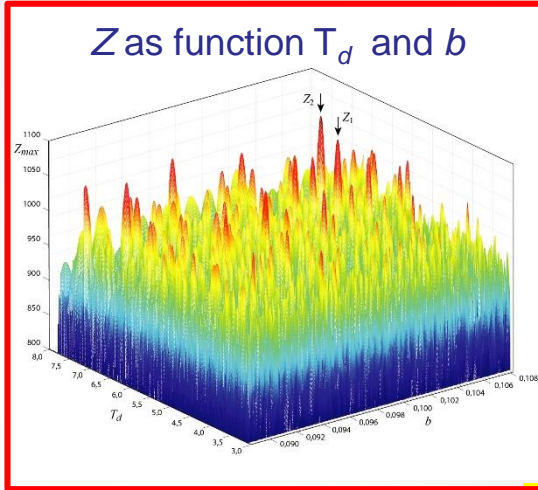


Unsplit period (theory): 4-6 h

Slichter mode, the long periodical free oscillation of the Earth, ${}_1S_1$, is caused by the translational oscillations of the solid inner core about its equilibrium position at the center of the Earth. The frequency of the Slichter mode is principally controlled by the **density jump** between the **inner (IC)** and **outer (OC)** core. Due to the Earth rotation, the mode should be observed in the form of a triplet. Reliable empirical data on the detection of Slichter mode are absent.

PREM:
 ICB density jump $\Delta\rho = 0.6 \text{ g/cm}^3$
 Periods (Crossley et al.)
 4.767, 5.310, 5.979 hr,
 $Q = 2000$ -5000

Splitting paramters [Dahlen&Sailor, 1978]:
 $a = 15,306 \cdot 10^{-3}$;
 $b = 98,380 \cdot 10^{-3}$;
 $c = -0,554 \cdot 10^{-3}$;



RESULTS

	Z_1	Z_2
T_d , hours	5.905	6.581
b	0.1038	0.1046
$\Delta\rho$, g/cm ³	0.456	0.360

Author	Model	T_{-1}	T_0	T_{+1}
Dziewonski and Anderson, 1981	PREM	4.6776	5.1814	5.7991
Widmer et al, 1988	Core11	5.1280	5.7412	6.5114
Crossley, 1992	PREM modified	4.7770	5.3100	5.9790
Rosat et al, 2006	PREM $\Delta\rho = 0,3 \text{ g/cm}^3$	6.1482	6.9855	8.2590
Rosat et al, 2006	PREM $\Delta\rho = 0,6 \text{ g/cm}^3$	4.7606	5.2971	5.9766
Smylie and Palmer, 2007	Cal8	3.5840	3.7731	4.0168
This work Z_1	experiment	5.2791	5.8160	6.4822
This work Z_2	experiment	5.8793	6.4818	7.2307

