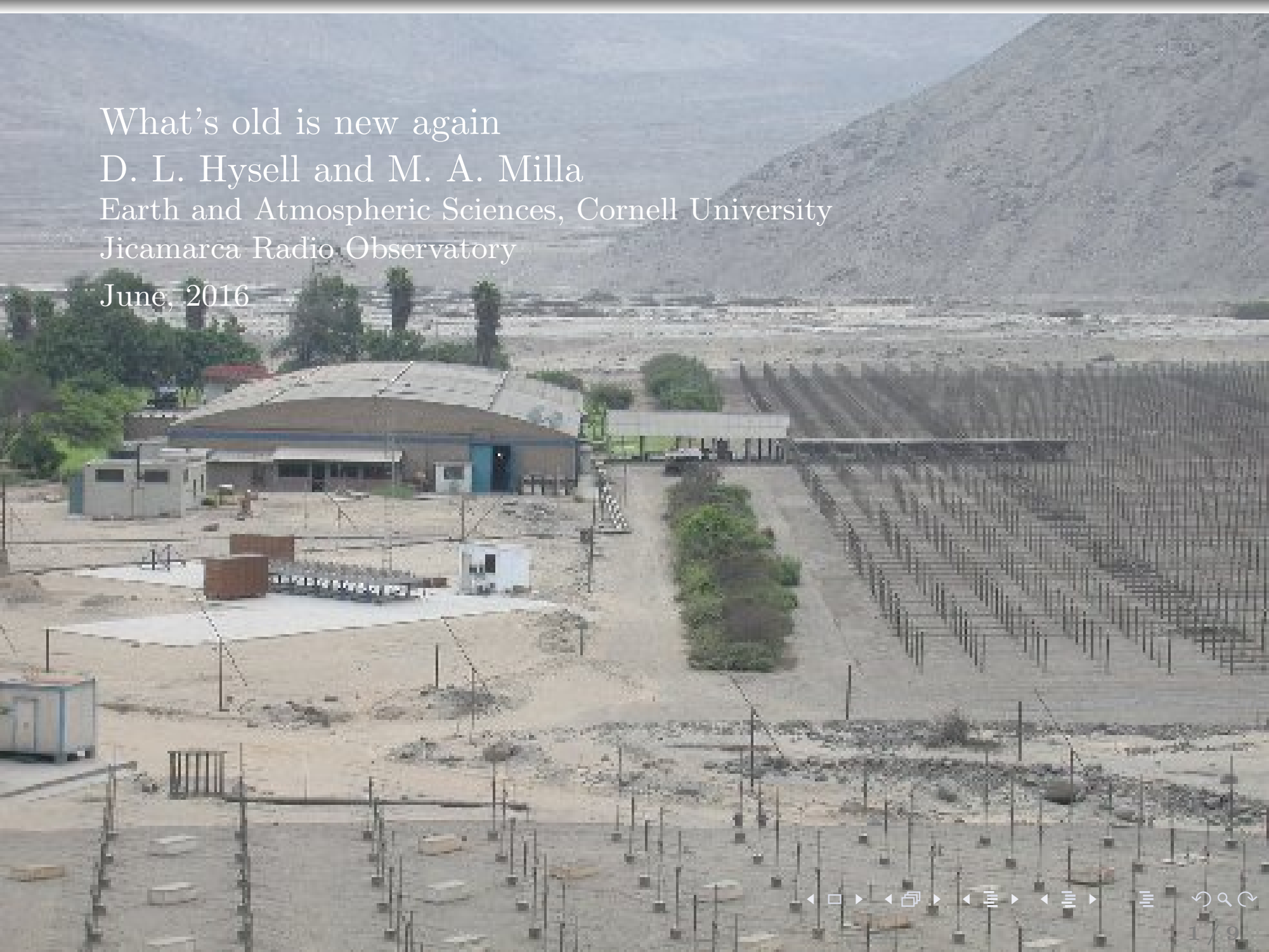


What's old is new again

D. L. Hysell and M. A. Milla
Earth and Atmospheric Sciences, Cornell University
Jicamarca Radio Observatory

June, 2016

outline

- High-altitude experiments
- SBS experiments

high-altitude ISR

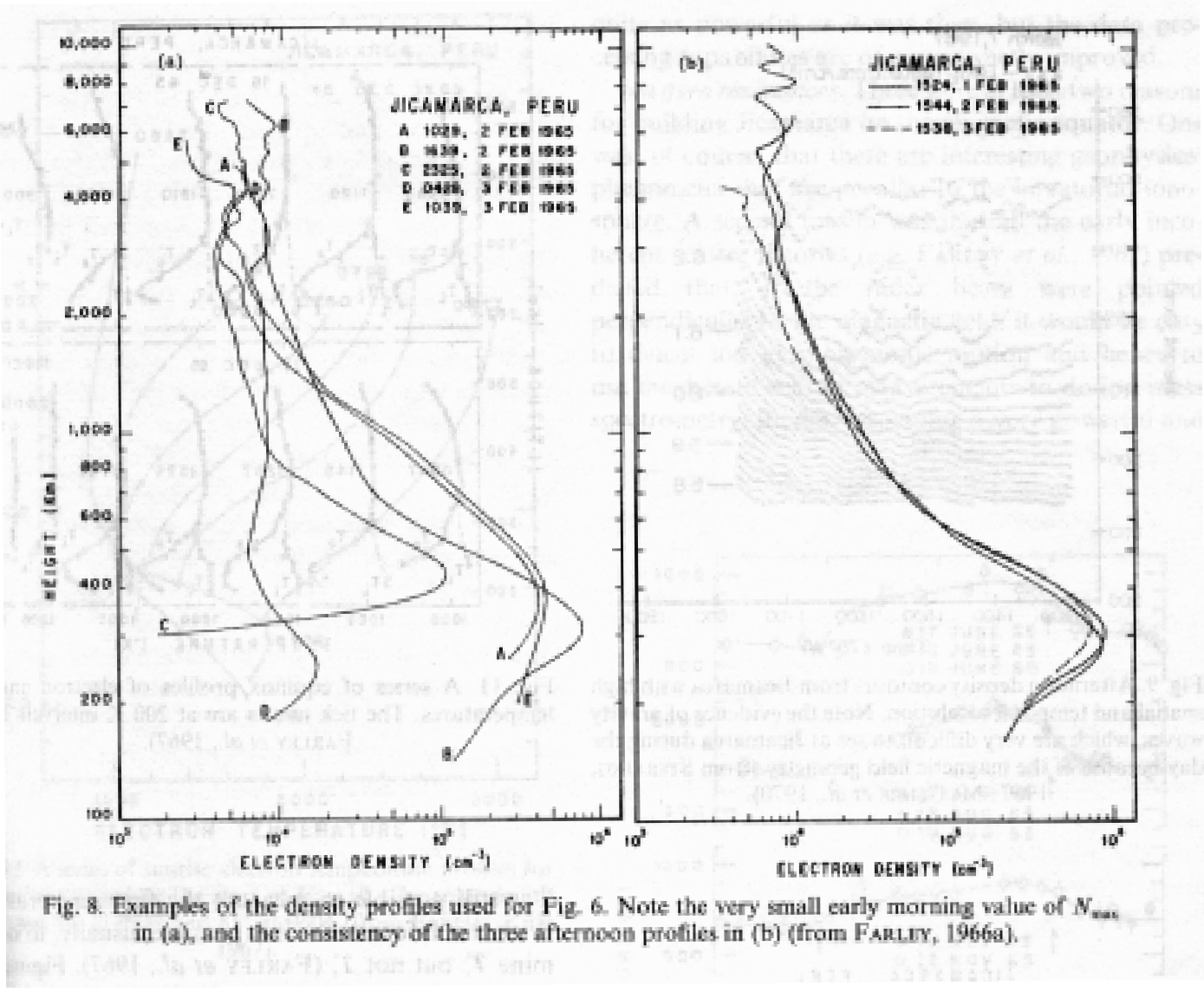


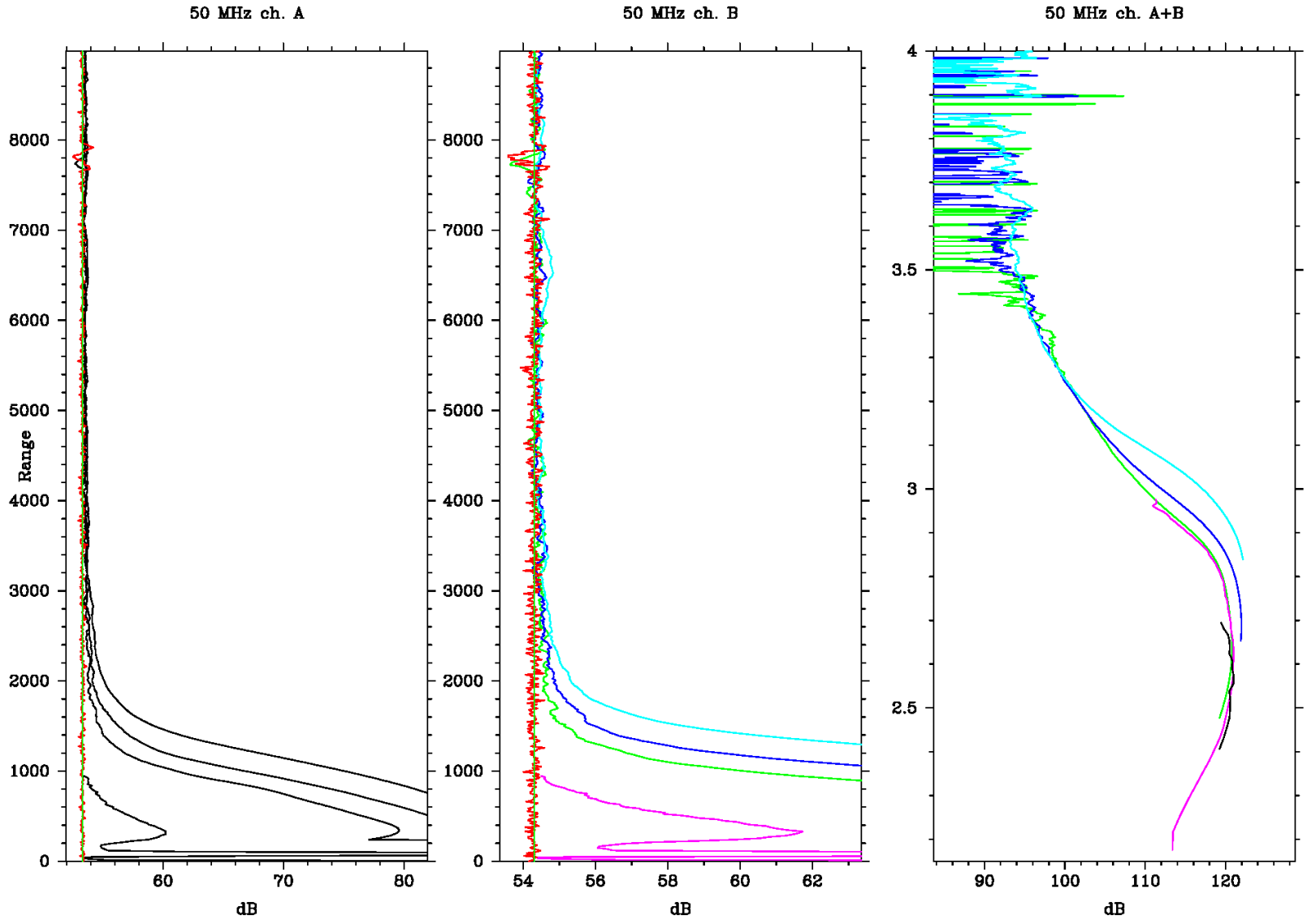
Fig. 8. Examples of the density profiles used for Fig. 6. Note the very small early morning value of N_{max} in (a), and the consistency of the three afternoon profiles in (b) (from FARLEY, 1966a).

After D. T. Farley, *J. Atmos. Sol. Terr. Phys.*, *53*, 665–675, 1991

configuration

- Main array, on-axis
- Two Tx driving LC, RC pol., respectively
- 4 ms, 2 ms, 1 ms pulse lengths + Faraday double pulse
- 100 ms IPP
- Receive both circulars, combine
- Remove clutter (order statistics)
- Process signals, noise using matched filters
- Normalize theoretically, then to Faraday angle

late afternoon



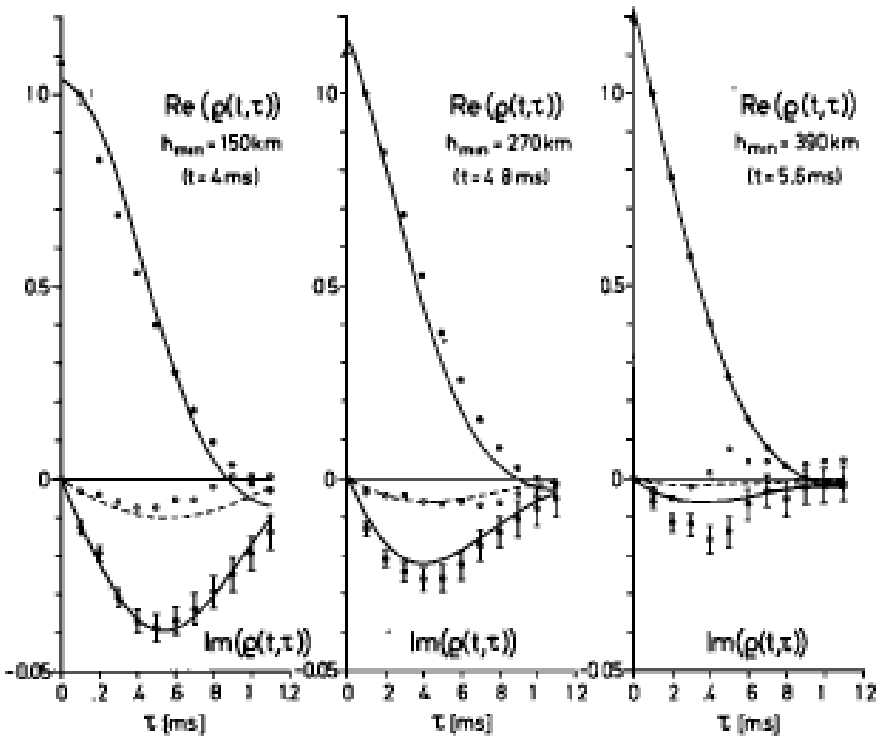


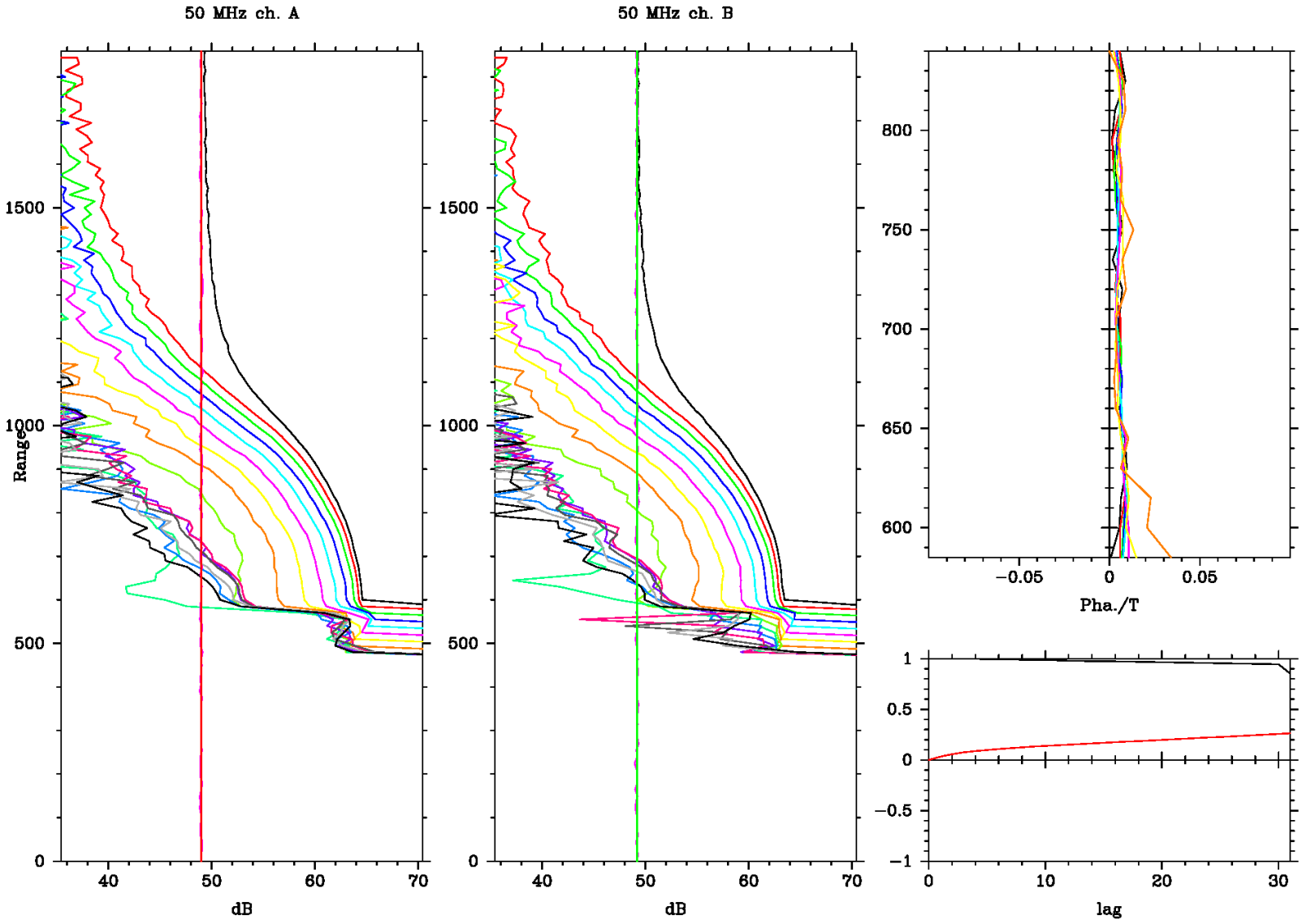
Fig. 3. Results of the stimulated Brillouin scattering experiment. The data represent the measurements with high transmitter power (~2 MW) and low transmitter power (~1 MW) as solid circles and open circles, respectively. The real parts are the same for both power levels. The curves represent computed autocorrelation functions using the model ionosphere of Figure 1 (solid line is high power and dashed line is low power). The data are normalized with respect to the real part for the first time lag. The scale of the imaginary part is $\frac{1}{10}$ of that of the real part.

After Fejer, J. A., K. Rinnert, and R. Woodman, *J. Geophys. Res.*, *83*, A5, 2133–2136, May 1, 1978

configuration

- Main array, “six-degree” position
- Two Tx, each driving half the array, one circular polarization
- Interrupt one Tx, vary ERP by factor of four
- 3.2 ms pulses
- 100 ms IPP
- Receive both circulars
- Long and coded (32-bit!) pulses
- Measure and compensate for Tx chirp

one transmitter



two transmitter