

## **Microphysical interpretation of coincident simultaneous and fast alternating horizontal and vertical polarization transmit data**

John Hubbert

National Center for Atmospheric Research, Boulder, CO, USA

Scott Ellis, National Center for Atmospheric Research, Boulder, CO

*E-mail: hubbert@ucar.edu*

Radars that achieve dual-polarization by transmitting both horizontal and vertical polarization simultaneously (SHV) are becoming the standard. It is well known that cross-coupling of the H and V transmitted waves due to aligned canted ice crystals bias polarimetric signatures. The bias is most evident in Zdr (differential reflectivity) as radial streaks in range of biased data. In 2008 during TiMREX (Terrain-influenced Monsoon Rainfall Experiment) in Taiwan, S-Pol (NCAR S-band dual polarized research radar) collected data both fast alternating H and V transmit (FHV) data as well as SHV data in close time proximity. This allows for a comparison of the FHV and SHV polarimetric signatures. The FHV data show radial streaks of LDR (Linear Depolarization Ratio) data in the same region where the radial SHV Zdr streaks are. Both are caused by cross-coupling. Using Kdp (specific differential phase) and Zdr, it is inferred that two populations of ice particles simultaneously exist in the radar resolution volumes. T-matrix scattering calculations support the inferences. Negative Kdp regions are shown where it is likely that an electric field vertically aligned the ice crystals. Team-R (Taiwan Experimental Atmospheric Mobile-Radar) X-band SHV data is also shown in conjunction with S-Pol FHV data that shows similar characteristics.