instability) created in the shocks are responsible for particle (electron, positron, and ion) acceleration. The simulation results show that the Weibel instability is responsible for generating and amplifying highly nonuniform, small-scale magnetic fields. These magnetic fields contribute to the electrons' transverse deflection behind the jet head. The "jitter" radiation from deflected electrons has different properties than synchrotron radiation which is calculated in a uniform magnetic field. This jitter radiation may be important to understanding the complex time evolution and/or spectral structure in gamma-ray bursts, relativistic jets, and supernova remnants.

David Paneque
Kipac/SLAC
The beginning of gamma-ray astronomy with Fermi

The Fermi observatory is designed to perform gamma-ray astronomy in the energy range 20 MeV to 300 GeV, with supporting measurements for gamma-ray bursts from 10 keV to 30 MeV. Fermi was successfully launched on June 11 (2008) from the Kennedy Space Center at Cape Canaveral. The main instrument of Fermi is the Large Area Telescope (LAT), which provides break-through high-energy measurements using techniques typically used in particle detectors for collider experiments. The LAT consists of 16 identical towers in a four-by-four grid, each one containing a pair conversion tracker and a hodoscopic crystal calorimeter, all covered by a segmented plastic scintillator anti-coincidence shield. The LAT is currently monitoring the GeV gamma-ray sky with rather uniform exposure (covering 20% of the sky at any instant and the entire sky on a timescale of a few hours) and a sensitivity ~30 times better than its predecessor, EGRET. The large performance improvement of LAT opens a new and important window on a wide variety of high-energy astrophysical phenomena, as well as potential to discover/study non-conventional physics. In the talk I will report the instrument performance, the mission status and science opportunities and will present some results derived from the first months of operation, which includes astronomical telegrams on AGN flares, 2 GCN circulars on LAT-detected GRBs and the monitoring of some selected sources (22 blazars and 1 high mass X-ray Binary).

Martin Pohl
Iowa State University
PIC simulations of magnetic field production by cosmic rays drifting upstream of SNR shocks

Turbulent magnetic-field amplification appears to operate near the forward shocks of young shell-type SNR. I review the observational constraints on the spatial distribution and amplitude of amplified magnetic field in this environment. I also present new PIC simulations of magnetic-field growth due to streaming cosmic rays. While the nature of the initial linear instability is largely determined by the choice of simulation parameters, the saturation always involves changing the bulk motion of cosmic rays and background plasma, which limits the field growth to amplitudes of a few times that of the homogeneous magnetic field.

Cara Rakowski
Naval Research Laboratory
Balmer line diagnostic of electron heating at collisionless shocks in supernova remnants

The mechanism and extent of electron heating at collisionless shocks has recently been under intense investigation. H\alpha Balmer line emission is excited immediately behind the shock