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Supernova Shear and Magnetic Field Amplification CYRIL ALLEN, North Carolina State University — A core collapse supernova marks the death of a star over 8 times the size of the sun. Sometimes in the aftermath of these explosions a spinning, magnetized, neutron star can be left behind, also known as a pulsar. It has recently been discovered that pulsar spins can arise through a spiral spherical accretion shock instability (SASI) of a supernova. This instability produces a strong shear flow inside the supernova shock wave, which might lead to amplification of the star's magnetic field. To study this possibility, hydrodynamic simulations have been modified to include a tracer of the magnetic field by adding the magnetic induction equation to the code. Diagnostics were added to the code to measure the overall field strength and shear flow generated by the SASI. I found the magnetic field could be amplified by a factor of 100 in only 20 milliseconds. This raises the possibility that shear-induced field amplification might be able to contribute to the energy of the supernova explosion and explain the high magnetic fields of the pulsar left behind.

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