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In this talk, I will present our recent developments in fast algorithms for total variation-based image reconstruction in partially parallel magnetic resonance imaging (PPI) where the inversion matrix is large and illconditioned. These algorithms utilize variable splitting technique to decouple the original problem into more easily solved subproblems. The first algorithm adopts the recently developed split Bregman algorithm to deal with the constraint arising from variable splitting, and applies the Barzilai-Borwein step size optimization method to significantly improve the convergence rate. The second algorithm exploits the special structure of the PPI reconstruction problem by decomposing it into one subproblem involving Fourier transforms and another subproblem that can be treated by primal-dual hybrid gradient (PDHG) scheme. Numerical results and comparisons with recently developed methods indicate the efficiency of the proposed algorithms. (Received January 16, 2011)