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Ivko Dimitric* (ivko@psu.edu), Mathematics Dept., Penn State University Fayette, Uniontown, PA 15401. *Some CR-submanifolds of low Chen-type in complex space forms*. Preliminary report.

We consider certain classes of CR-submanifolds $x : M^n \rightarrow \mathbb{C}Q^m$ of non-flat complex space forms whose Chen type is 2 or 3, via the immersion $\Phi : \mathbb{C}Q^m \rightarrow H(m+1)$ into the (pseudo) Euclidean space of Hermitian matrices by projection operators. According to B. Y. Chen, a submanifold of Euclidean space is said to be of finite type (k -type) if the position vector allows a decomposition into a sum of a constant vector and finitely many (k) vector-eigenfunctions of the Laplacian. The immersion whose type we are studying here is $\tilde{x} = \Phi \circ x$. We classify Hopf hypersurfaces of 2-type in $\mathbb{C}Q^m$ and CMC Hopf hypersurfaces of $\mathbb{C}Q^2$ which are mass-symmetric and of 3-type (e.g. the tubes about the complex quadric). For higher codimension, the most promising study involves either the holomorphic or the totally-real submanifolds. We prove some nonexistence results for 2-type submanifolds such as for the holomorphic ones in $\mathbb{C}H^m(-4)$ and for ruled hypersurfaces in $\mathbb{C}Q^m$. We give geometric characterizations of Lagrangian submanifolds (mass-symmetric or with parallel mean curvature vector) in $\mathbb{C}Q^m$ as well as of complex hypersurfaces of 3-type in complex space forms. (Received September 16, 2008)