Isometric immersions with singularities between space forms of the same non-negative curvature

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By the Hartman-Nirenberg theorem, any isometric immersion between flat space forms of codimension 1, i.e., complete flat hypersurface in Euclidean space, is a cylinder over a plane curve.

However, there are many non-trivial flat surfaces with singularities called 'flat fronts'. Murata-Umehara classified complete flat fronts in Euclidean 3-space and proved their global properties, including the four vertex-type theorem.

In this talk, we show the non-existence theorem of complete flat fronts in Euclidean space whose dimension is greater than three. Moreover, we classify isometric immersions with singularities (as wave fronts) between space forms of the same positive curvature, which is a generalization of a theorem of O'Neill and Stiel: any isometric immersion of the n-sphere into the $(n+1)$-sphere of the same sectional curvature is totally geodesic.