

ABSTRACT. Quaternionic maps (Q-maps) between hyperkähler manifolds are quaternionic analogue of Cauchy-Riemann equations between Kähler manifolds. We provide a necessary and sufficient condition on when a quaternionic map becomes holomorphic with respect to some complex structures in the hyperkähler 2-spheres, and give examples of Q-maps which cannot be holomorphic. When the domain is real 4-dimensional, we analyze the structure of the blow-up set of a sequence of Q-maps, and show that the singular set of a stationary Q-map is \mathcal{H}^1 -rectifiable.