1145-65-924   **Lewei Zhao*** (`fp5042@wayne.edu`), 5200 Anthony Wayne Drive, Apt.Deroy#604, Detroit, MI 48202, and **Hao Pan** and **Zhimin Zhang**. *Some New Developments of Polynomial Preserving Recovery on Hexagon Pattern and Chervon Pattern.*

Polynomial Preserving Recovery (PPR) is a very popular post-processing techniques for finite element methods. In this article, we propose and analyze an effective linear element PPR on a new pattern so called Hexagon. By giving an interior estimates for discrete Green function and expansion analysis for the superconvergence theory , we prove that liner element PPR on this new pattern can reach $O(h^4|\ln h|^{\frac{1}{2}})$ superconvergence for recovering gradient of Possion problems in 2-d. In addition, we supplements the quadratic element PPR on the uniform grid of the Chervon pattern with an application in wave equation, which further verifies the superconvergence theory. (Received September 17, 2018)