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**Prasit Bhattacharya\*** (pb9wh@virginia.edu), 701 East High Street, Apt 219, Charlottesville, VA 22902. *On the  $P_2^1$  Margolis homology of  $tmf$ .*

$P_2^1$  is a certain element of the Steenrod algebra which squares to zero and is contained in the subalgebra  $A(2)$ . In this talk we give a complete calculation of the  $P_2^1$  Margolis homology of the homology of  $tmf$  which is isomorphic to  $A//A(2)$ . The  $P_2^1$  Margolis homology computation is necessary to identify the free  $HF_2$  summands of  $tmf \wedge tmf$ . This project is motivated by the height 1 case, where identifying the free  $HF_2$  summands of  $bo \wedge bo$  is essential for computing the  $E_2$ -page of  $bo$ -based Adams spectral sequence for the sphere spectrum. The difficulty in computing  $P_2^1$  Margolis homology is that the action of  $P_2^1$  does not follow the Leibniz rule. The computation is carried out via a spectral sequence using a few combinatorial tricks. This is joint work with Irina Bobkova and Brian Thomas. (Received February 07, 2018)