

BOSTON UNIVERSITY NUMBER THEORY SEMINAR

# A space of mod 2 modular forms of level 3 and its Hecke algebra

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Monday, Sept 28 at 4:15 pm  
111 Cummington Street, MCS B21  
Tea and cookies in MCS 144 at 4:00 pm

**Abstract:** Let  $F$  in  $\mathbf{Z}/2[[x]]$  be  $x + x^9 + x^{25} + x^{49} + \dots$ , and let  $V$  be spanned by the odd powers of  $F$ . If  $p$  is an odd prime, the formal Hecke operator  $T_p$  on  $\mathbf{Z}/2[[x]]$  takes  $F^k$  to a sum of  $F^j$  with  $j < k$ ; this can be proved by interpreting  $V$  as a space of mod 2 modular forms of level 1.

When one completes the Hecke algebra coming from the  $T_p$  acting on  $V$  at the ideal generated by the  $T_p$ , one gets a power series ring in  $T_3$  and  $T_5$ . This remarkable result was proved by Nicolas and Serre. My talk will give a level 3 variant of the Nicolas–Serre theorem where the completed Hecke algebra is a two-variable power series ring with an element of square 0 adjoined. If time allows I'll describe results, conjectures, and guesses in some other levels.