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**Ronny Hadani** ([hadani@math.utexas.edu](mailto:hadani@math.utexas.edu)), 1 University Station C1200, Austin, TX 78712. *The Categorical Weil Representation and the Sign Problem.*

In a previous work the authors gave a conceptual explanation for the linearity of the Weil representation over a finite field  $k$  of odd characteristic: There exists a canonical system of intertwining operators between the Lagrangian models of the Heisenberg representation. This defines a canonical vector space  $H(V)$  associated with a symplectic vector space  $V$  over  $k$ . In the lecture we prove a general theorem about idempotents in categories, and we use it to solve the sign problem, formulated by Bernstein and Deligne, on the compatibility between the associativity constraint and the convolution structure of the  $l$ -adic sheaf of canonical intertwining kernels. This sheaf governs—via the sheaf-to-function correspondence—the function theoretic system of intertwiners. As an application we define a canonical category  $C(V)$  associated with the symplectic vector space variety  $V$ , and we obtain the canonical model of the categorical Weil representation. (Received February 13, 2012)