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**Farzad Fathizadeh, Yeorgia Kafkoulis and Matilde Marcolli\*** (matilde@caltech.edu). *Bell polynomials and Brownian bridge in Spectral Gravity models on multifractal Robertson-Walker cosmologies.*

We obtain an explicit formula for the full expansion of the spectral action on Robertson-Walker spacetimes, expressed in terms of Bell polynomials, using Brownian bridge integrals and the Feynman-Kac formula. We then apply this result to the case of multifractal Packed Swiss Cheese Cosmology models obtained from an arrangement of Robertson-Walker spacetimes along an Apollonian sphere packing. Using Mellin transforms, we show that the asymptotic expansion of the spectral action contains the same terms as in the case of a single Robertson-Walker spacetime, but with zeta-regularized coefficients, given by values at integers of the zeta function of the fractal string of the radii of the sphere packing, as well as additional log-periodic correction terms arising from the poles (off the real line) of this zeta function. (Received January 05, 2019)