**ABSTRACT**

Let $\mathcal{W}$ denote the space of 2-adic weights, and let $P(\kappa, T)$ denote the characteristic power series of the completely continuous operator $U_2$ acting on the space of overconvergent 2-adic cusp forms of weight $\kappa$. We construct a map $\kappa(u)$ from the 2-adic rigid analytic annulus $\mathcal{A}$ defined by $1 > |u| \geq |64|$ to the space of 2-adic weights $\mathcal{W}$, such that for any $\kappa \in \mathcal{W}(\mathbf{C}_2)$, the points of $u \in \mathcal{A}(\mathbf{C}_2)$ lying over $\kappa$ are precisely the reciprocal zeroes of $P(\kappa, T)$ of minimal slope.

Furthermore, we construct a family $f(u)$ of overconvergent 2-adic cusp forms of weight $\kappa(u)$ rigid analytically parameterized by $\mathcal{A}$, such that for any $u \in \mathcal{A}(\mathbf{C}_2)$, the cusp form $f(u)$ is the unique normalized overconvergent 2-adic Hecke eigenform of weight $\kappa$ whose $U_2$-eigenvalue is equal to $u$.

The construction is explicit, and allows us to prove precise congruences between the eigenforms $f(u)$ for different values of $u$, as well congruences between the family of cusp forms $f(u)$ and the family of Eisenstein series $E^*_{\kappa(u)}$.