CORRIGENDUM TO IMRN PAPER
"MAASS CUPS FORMS WITH QUADRATIC INTEGER COEFFICIENTS"

(1) *Remark:* The icosahedral subgroup of $PGL_2(\mathbb{C})$ generated by the matrices in (2.7) lifts not only to a subgroup of $GL_2^{(1)}(\mathbb{C})$ but to $GL_2^{(2)}(\mathbb{C})$ as well. The trace field of the latter group is a degree 4 extension of $\mathbb{Q}$, given by adjoining the element

$$w = 2\Im(\epsilon) = \frac{i}{4}\sqrt{10 - 2\sqrt{5}}. \tag{1}$$

One sees quickly that $\mathbb{Q}(w)$ contains $\mathbb{Q}(\sqrt{5})$ as its unique proper sufield over $\mathbb{Q}$. A cusp form π associated to an icosahedral Galois representation whose coefficients lie *strictly* in $\mathbb{Q}(\sqrt{5})$ is therefore prohibited from having a quadratic non-trivial central character. This clarifies why only those π whose central chacter was trivial presented an obstacle to the exclusion of $\mathbb{Q}(\sqrt{5})$ in the theorem.

(2) *Overhaul of Section 3.3:* We begin our corrections directly after equation number (3.3). We restrict our attention to the case when π has coefficients in $K = \mathbb{Q}(\sqrt{-2})$. If $\lambda_\pi(p) = a + b\sqrt{-2}$, then in this setting we have $x = 2a$ and $y = a^2 + 2b^2$. The following points are representable as $(x, y) = (2a, a^2 + 2b^2)$, where $a, b \in \mathbb{Z}$:

$$(0,0), \quad (\pm 2, 1), \quad (0,2), \quad (\pm 2, 3), \quad (\pm 4, 4), \quad (4,6), \quad (6,9); \tag{2}$$

and each lies on the vanishing locus of the polynomial

$$T(x,y) = (y - \frac{1}{2}x)(y - \frac{1}{2}x - 2)(y - \frac{1}{2}x - 4)(y - \frac{1}{2}x - 6).$$

All other points $(2a, a^2 + 2b^2)$, as can easily be checked, lie above the line $y = \frac{1}{2}x + 6$, on which region T takes positive values. The mean value $I(T)$ should therefore be non-negative. On the other hand, we may compute the identities

$$\begin{gathered} I(y) = 1, \quad I(y^2) = 2, \quad I(y^3) = 5, \quad I(y^4) = 14, \\ I(x^2) = 2, \quad I(x^4) = 16, \quad I(x^2 y) = 4, \quad I(x^2 y^2) = 10, \end{gathered} \tag{3}$$

and observe that $I(P(x,y)) = 0$ if P is odd in x and the degree of $P(x,x)$ is less than or equal to 4. We use linearity in I and the vlues in (3) to calculate that

$$\begin{aligned} I(T(x,y)) = I(&y^4 - 2xy^3 - 12y^3 + \frac{3}{2}x^2y^2 + 18xy^2 + 44y^2 \\ &- \frac{1}{2}x^3 y - 9x^2 y - 44xy - 48y + \frac{1}{16}x^4 + \frac{3}{2}x^3 + 11x^2 + 24x) = -4. \end{aligned}$$

This produces the desired contradiction. ☐