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**Andrew Kustin, Hamid Rahmati** and **Adela Vraciu\*** (vraciu@math.sc.edu). *The resolution of Frobenius powers of the maximal ideal in diagonal hypersurface rings.*

We consider ideals of the form  $I_N = (x^N, y^N, z^N)$  in the ring

$$R_{n,p} = \frac{k[x, y, z]}{(x^n + y^n + z^n)},$$

where  $k$  is a field of characteristic  $p$ .

Our main result gives a necessary and sufficient condition for the ideal  $I_N$  to have finite projective dimension. Our criterion depends only on the values of  $a$  and  $p$ , where  $a = \lfloor \frac{N}{n} \rfloor$ .

In the case when the projective dimension is infinite, we give an explicit description of the periodic part of the resolution, which depends only on the parity of  $a$ , and the value of  $r$ , where  $r$  is such that  $N = an + r$ . (Received August 27, 2010)