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**YoungJu Choie\*** (yjc@postech.ac.kr), Dept of Mathematics, POSTECH(Pohang University of Sciences and Tec, Pohang, 790-784, South Korea. *Automorphic forms and Cohomology.*

We investigate the correspondence between holomorphic automorphic forms on the upper half-plane with complex weight and parabolic cocycles. For integral weights at least 2 this correspondence is given by the Eichler integral. We show that for these weights the generalized Eichler integral gives an injection into the first cohomology group with values in a module of holomorphic functions, and characterize the image. We impose no condition on the growth of the automorphic forms at the cusps. Our result concerns arbitrary cofinite discrete groups with cusps, and covers exponentially growing automorphic forms, like those studied by Borchers, and like those in the theory of mock automorphic forms. We extend to positive real weights Haberland's formula giving a cohomological description of the Petersson scalar product of modular cusp forms of positive even weight. This is a part of joint work with R. Bruggeman and N. Diamantis. (Received January 24, 2019)