1080-37-130 **M Barge**, Mathematical sciences Departmant, Bozeman, MT 59715, and **Robert F Williams*** (bob@math.utexas.edu), c1200, 1 University Station, Austin, TX. *Asymptotic structures for Penrose, Tübingen and octagon tilings.* Preliminary report.

The *asymptotic structure* of one dimensional tiling spaces was introduced and used extensively, by Barge and others. It is in effect, a topological invariant. Recently, Barge-Olimb extended this concept to higher dimensional substitution tiling spaces and computed it for several cases: for the "half hexagon", this is just 3 tilings, fixed under inflation, which differ only near the origin; for the Penrose tiling it has the Fibonacci substitution system as a factor. Here we compute this invariant for the three substitution tiling spaces indicated. In the process we carry out the 'balanced pair' algorithm, (also recently extended) verifying that the $\mathbb{R}^2$ action has pure discrete spectrum in these cases. Of course this last is well known as these tilings can also be presented as cut and project tilings. (Received January 20, 2012)