Let P be an abstract 3-dimensional polytope.

We say that a face f_i of P is *adjacent* to a face f_j if $f_i \cap f_j$ is an edge.

By a *prismatic k-circuit* we mean k facets $f_1, \dots, f_k$ of P such that

- f_i has a common side with f_{i+1} for all $i = 1, \dots, k$, where $f_{k+1} := f_1$;
- no three of $f_1, \dots, f_k$ have a common vertex.

Notation. if f_i is adjacent to f_j, denote by α_{ij} the angle between f_i and f_j.

Theorem [And1].
A compact acute-angled polytope P of a given simple combinatorial type with given dihedral angles exists in $\mathbb{H}^3$ if and only if the following conditions hold:

(1) if three faces f_i, f_j, f_k pass through the same vertex then $\alpha_{ij} + \alpha_{jk} + \alpha_{ki} > \pi$;
(2) if the faces f_i, f_j, f_k form a 3-circuit, then $\alpha_{ij} + \alpha_{jk} + \alpha_{ki} < \pi$;
(3) if four faces f_i, f_j, f_k, f_l form a 4-circuit then $\alpha_{ij} + \alpha_{jk} + \alpha_{kl} + \alpha_{li} < 2\pi$;
(4) if P is a *triangular prism* then at least one dihedral angle between a triangular side and a quadrilateral side is not equal to $\frac{\pi}{2}$;
(5) if P is a *tetrahedron* then the determinant of the Gram matrix should be negative.

Theorem [And2].
A finite volume acute-angled polytope P of a given simple in edges combinatorial type with given dihedral angles exists in $\mathbb{H}^3$ if and only if the following conditions hold:

(1a) if three faces f_i, f_j, f_k pass through the same vertex then $\alpha_{ij} + \alpha_{jk} + \alpha_{ki} \geq \pi$;
(1b) if four faces pass through the same vertex then all angles formed by them are equal to $\frac{\pi}{2}$;
(2a) if the faces f_i, f_j, f_k form a 3-circuit, then $\alpha_{ij} + \alpha_{jk} + \alpha_{ki} < \pi$;
(2b) if f_i is adjacent to f_j and f_k, and f_j is not adjacent to f_k, but $f_j \cap f_k$ is an ideal vertex, then $\alpha_{ij} + \alpha_{ik} < \pi$;
(3) if four faces f_i, f_j, f_k, f_l form a 4-circuit then $\alpha_{ij} + \alpha_{jk} + \alpha_{kl} + \alpha_{li} < 2\pi$;
(4) if P is a *triangular prism* then at least one dihedral angle between a triangular side and a quadrilateral side is not equal to $\frac{\pi}{2}$;
(5) if P is a *tetrahedron* then the determinant of the Gram matrix should be negative.