
New Folder Name Modulation Notes

Notes on Modulation and Topology Concepts for Recombined Fabry-Perot Interferometers

There are two main problems which are not encountered in non-recombined systems —

1. How can one get differential modulation between the two arms?

Some possible solutions —

- (a) Use differential modulation by side-arm modulators. (in 1989 Proposal)
- (b) Use no modulation on the main system — operate at DC — and add modulation at the output (external modulation technique). (in 1985 Proposal)
- (c) Use a single modulation of the common input beam, but make the free spectral range of each arm such that differences in amplitude or phase of modulation are produced. (New concept — not yet certain).

2. How can one get separate information to lock the two cavities and to lock the front mirrors at equal distances from the beam splitter?

(a) Use sideband light of sufficiently different wavelength to reflect only off the front mirrors of the arms (out of resonance in the cavities) — an optical sub-carrier.

(b) Use mechanical dithering of front mirrors or of the beam splitter

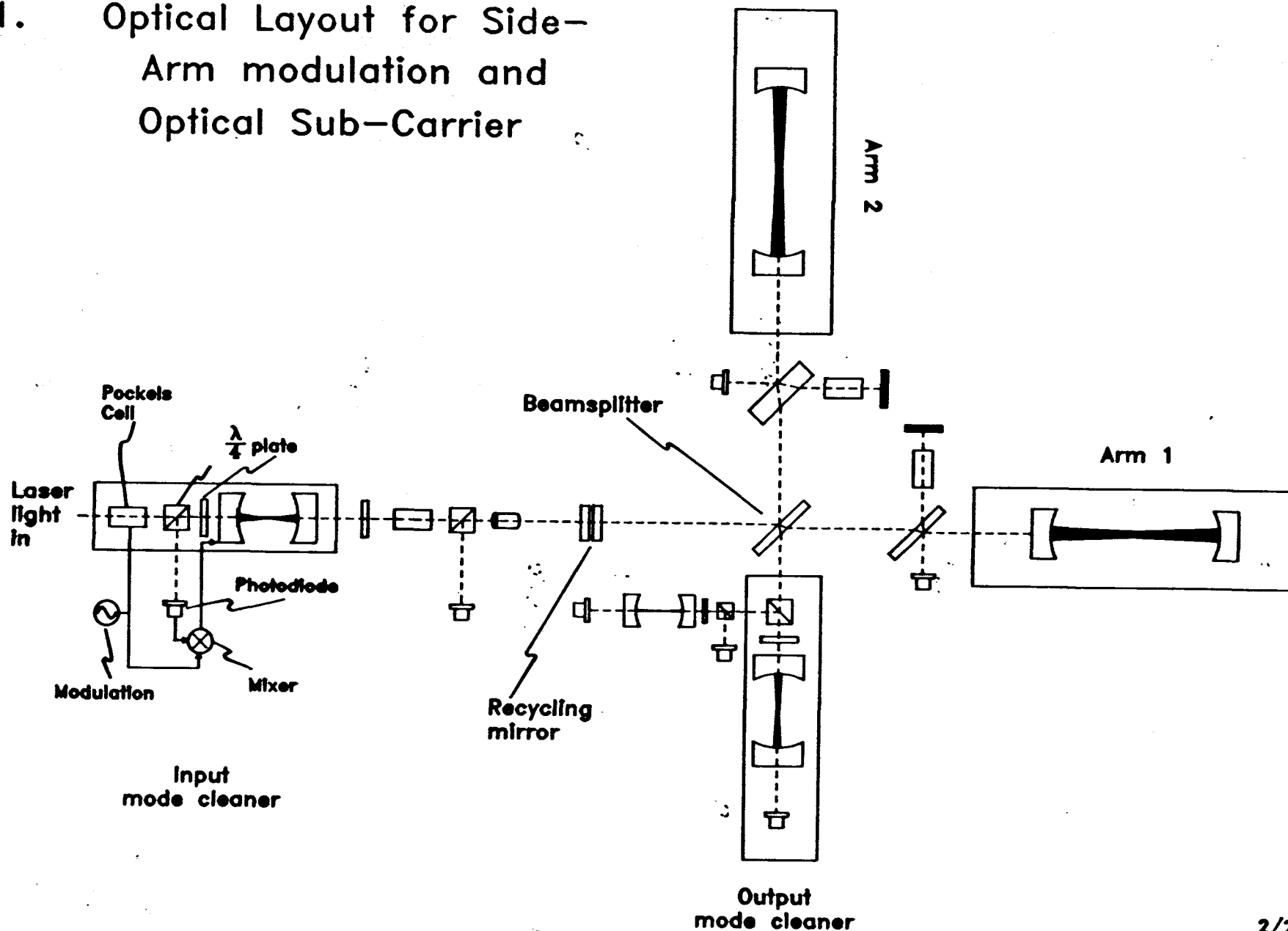
Danger of noise from dithering vibration?

(c) Use the possible redundancy of information in the signals from the main differential output and from each cavity.

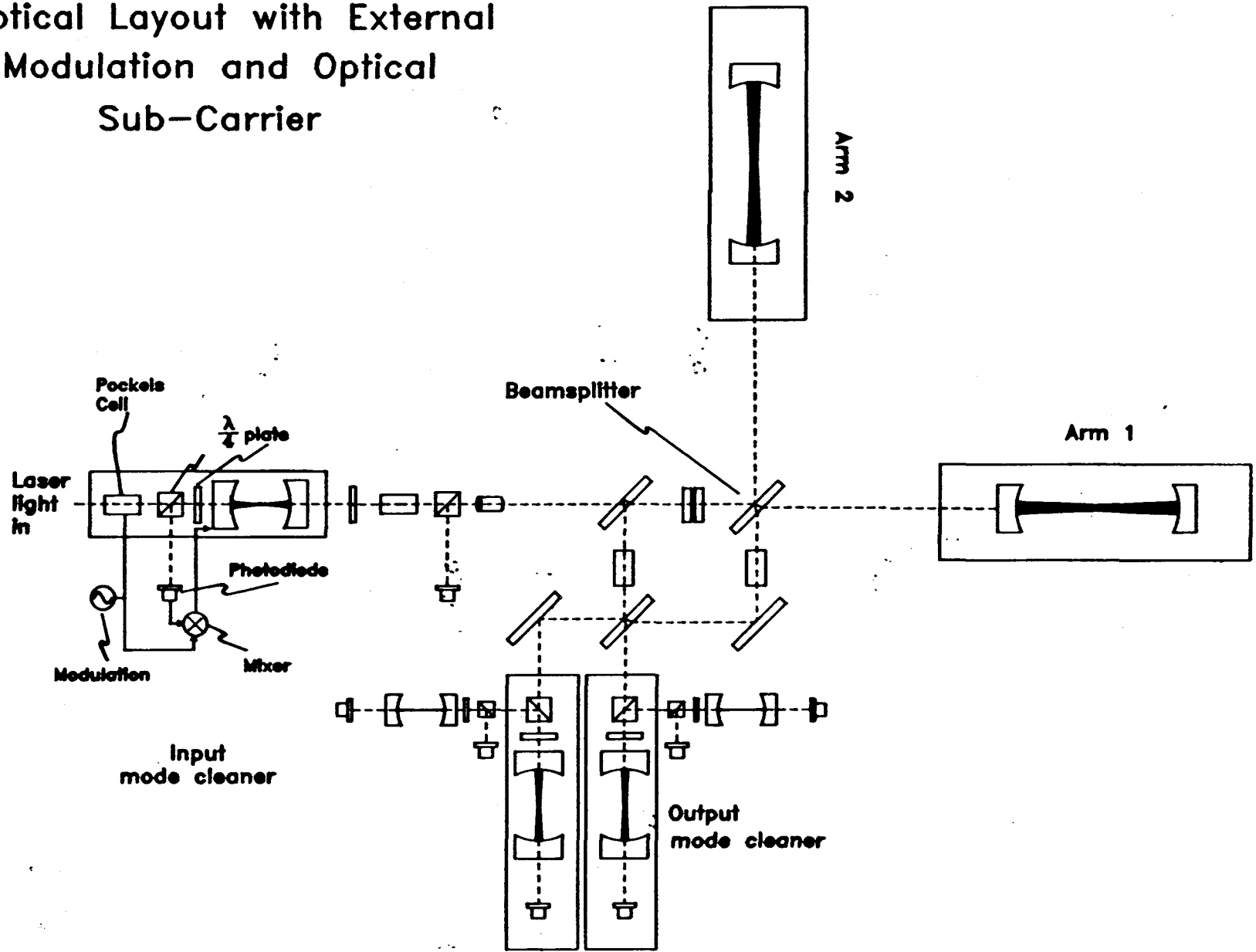
Currently a combination based on 1(a), or 1(b), and 2(a) seems the safest, and if further work backs this up, this can be a good initial design to adopt.

(2/20/91:R.Drever)

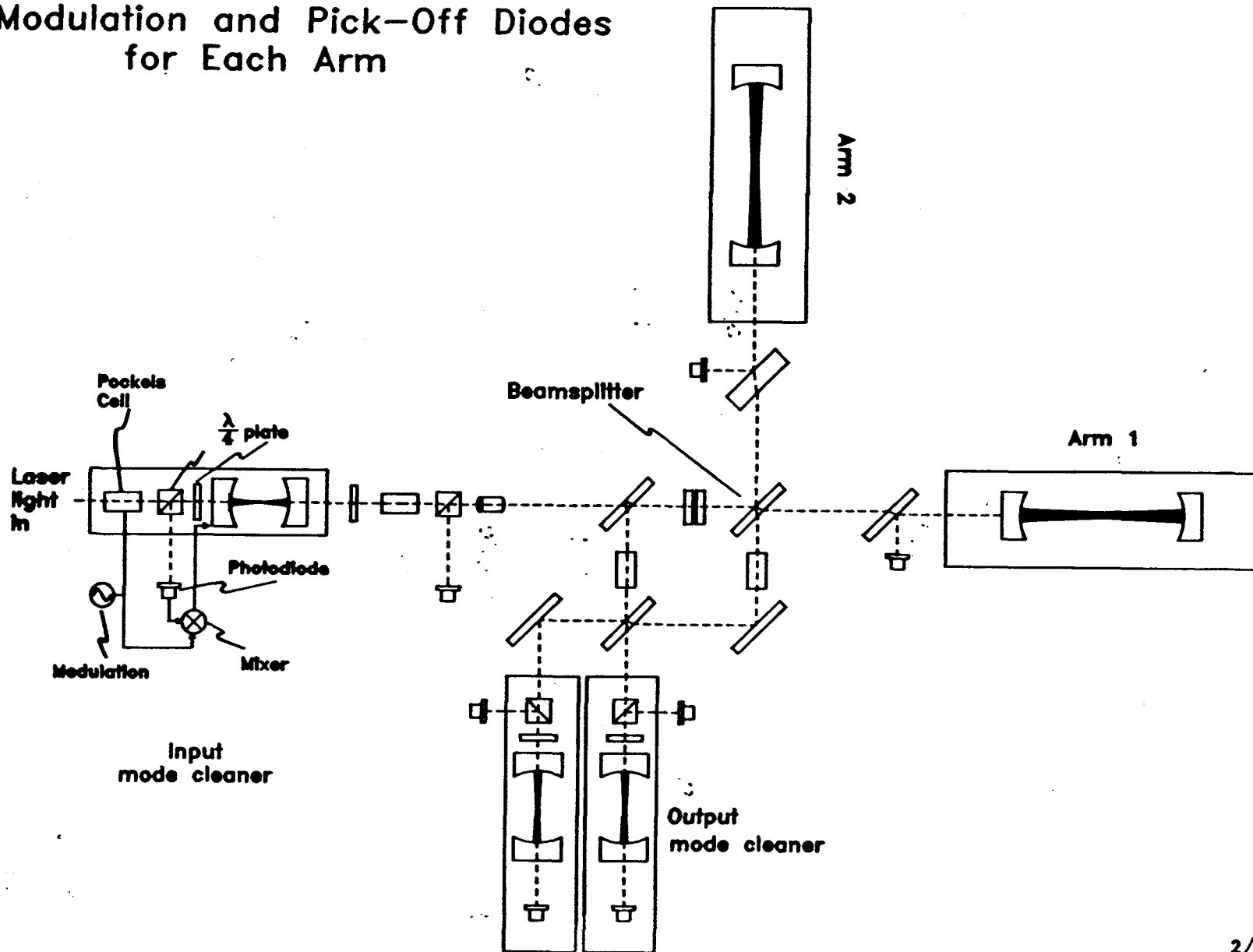
1. Optical Layout for Side-Arm modulation and Optical Sub-Carrier



2. Optical Layout with External Modulation and Optical Sub-Carrier



3. Optical Layout with External Modulation and Pick-Off Diodes for Each Arm



4. Conceivable Target Layout for Differential-Tuned Concept

