BULLETIN OF THE
AMERICAN MATHEMATICAL SOCIETY
Volume 80, Number 5, September 1974

THE ORIENTED TOPOLOGICAL AND PL COBORDISM RINGS[1]

BY I. MADSEN AND R. J. MILGRAM

Communicated by William Browder, December 17, 1973

1. **Introduction and statement of results.** In this note we announce results on the 2-local structure of the oriented topological cobordism ring Ω_*^{TOP} and its PL analogue Ω_*^{PL}.

It is a well-known consequence of transversality that

$$\Omega_*^{\mathrm{TOP}} = \pi_*(\mathrm{MSTOP}), \qquad * \neq 4 \quad \text{and} \quad \Omega_*^{\mathrm{PL}} = \pi_*(\mathrm{MSPL}),$$

where MSTOP and MSPL are the oriented Thom spectra.

Also, the homotopy theory of these spectra divides into two distinct problems: the theory *at* the prime 2 and the theory *away* from 2. We let $\boldsymbol{Z}_{(2)}$ denote the integers localized at 2 and $\boldsymbol{Z}[\frac{1}{2}]$ the integers localized away from 2.

Sullivan [9] showed that the free part of $\Omega_*^{\mathrm{TOP}}\otimes\boldsymbol{Z}[\frac{1}{2}]$ $(=\Omega_*^{\mathrm{PL}}\otimes\boldsymbol{Z}[\frac{1}{2}])$; $\Omega_*^{\mathrm{TOP}}/\mathrm{Tor}\otimes\boldsymbol{Z}[\frac{1}{2}]$ is a polynomial algebra with one generator in each dimension congruent to zero mod 4.

At the prime 2 Browder, Liulevicius and Peterson [2] show that the localized spectra $\mathrm{MSTOP}_{(2)}$ and $\mathrm{MSPL}_{(2)}$ become wedges of Eilenberg-Mac Lane spectra. Hence the homotopy theory is a direct consequence of the homology theory. In particular,

$$(\Omega_*^{\mathrm{TOP}}/\mathrm{Tor}) \otimes \boldsymbol{Z}_{(2)} = H_*(\mathrm{BSTOP}; \boldsymbol{Z}_{(2)})/\mathrm{Tor} \tag{1.1}$$

and similarly in the PL case.

Let M_0^{4n}, $n>1$, be the Milnor manifold of index 8 constructed by plumbing disk tangent bundles of S^{2n} (see Browder [1, p. 122]). The boundary of M_0^{4n} is the PL sphere S^{4n-1}. We set $M^{4n}=M_0^{4n} \cup_\partial CS^{4n-1}$ to obtain a closed PL manifold of index 8.

In the rest of this note, $P(X)$, $E(X)$ and $\Gamma(X)$ will denote the polynomial algebra, exterior algebra, and divided power algebra, respectively generated by the set X. For a natural number n, $\alpha(n)$ will be the number of nonzero terms in the dyadic expansion and $\nu(n)$ the 2-adic valuation ($n=2^{\nu(n)}$ odd).

AMS (MOS) subject classifications (1970). Primary 57A70, 57C20.

[1] Partially supported by NSF contract 29696.